OFFSET SYSTEM DISCUSSION PAPER

This paper does not reflect an official position of the Government of Canada; its purpose is to provide a basis for consultations on the possible design of an offset system as proposed in the Climate Change Plan for Canada.

TABLE OF CONTENTS

	Paragraph Numbers
1 Introduction	**1 - 25**
A Purpose	1 - 3
B Background	4 - 8
C Economic Basis of an Offset System	9 - 25
2 Core Design Elements	**26 - 48**
A Legal Framework	26
B Principles	27 - 34
C Eligibility Criteria	35 - 45
D Links with International System	46 - 48
3 Administration of the Offset System	**49 - 78**
A Offset System Governance	49 - 55
B Review Process	56 - 69
C Registries	70 - 75
D Market Structure	76 - 78
4 Design Issues	**79 - 123**
A Baselines	79 - 90
B Boundaries and Leakage	91 - 100
C Addressing Non-Permanence of Removals Projects	101 - 123
5 Application of Proposed Framework to Selected Sectors	**124 - 211**
A Forests	124 - 156
B Agriculture	157 - 182
C Landfill Gas	183 - 203
D Other Sectors	204 - 211
6 Next Steps and Further Information	**212 - 214**
A Next Steps	214 - 213
B Further Information	214
Annexes	
1 Acronyms and Glossary	
2 Large Industrial Emitters	
3 Discussion Questions	

1 INTRODUCTION

A. Purpose

[1] The purpose of this Discussion Paper is to provide a basis for national consultations on the design and administration of an offset system. (Annex 1 includes a glossary that defines "offset" and other terms used in this document.) The paper elaborates on the principles, eligibility criteria, review process and sector-specific design issues outlined in the Key Elements paper circulated in early May 2003.

[2] To facilitate the consultations, this *Discussion Paper* identifies a number of the key issues and poses questions to solicit feedback from provinces/territories and stakeholders. This input can be provided in written submissions sent to the address provided in Section 6 or during the consultation sessions being held across the country in June.[1] The feedback received will be considered when the *Design Paper*, which will outline a complete offset system design and administration package, is drafted in the fall of 2003. Comments on the *Design Paper* will also be solicited.

[3] The rest of this *Discussion Paper* is laid out in five main sections: (2) Core design elements, (3) Administration of the offset system, (4) Design issues, (5) Application of the proposed framework to selected sectors, and (6) Next steps and further information. In addition there are three annexes. Key questions for the consultations are shown throughout the text and summarized in Annex 3.

B. Background

[4] Under the Kyoto Protocol, Canada is committed to reducing its average annual greenhouse gas (GHG) emissions to 6 percent below 1990 levels during the first commitment period (2008-2012).[2] This equates to a reduction of 240 megatonnes (Mt) carbon dioxide equivalent (CO_2e) from our projected "business-as-usual" (BAU) emission level in 2010. The *Climate Change Plan for Canada* (Plan) sets out a three-step approach for achieving Canada's Kyoto target.[3] First, investments committed prior to the Plan will address one-third of the total reduction (80 Mt CO_2e). Second, the Plan defines a strategy for a further 100 Mt CO_2e reduction. Finally, the Plan outlines a number of current and potential actions that should enable Canada to address the remaining 60 Mt CO_2e

[1] Information on the consultations process is available at the Government of Canada Climate Change website (www.climatechange.gc.ca).

[2] For more information on the Kyoto Protocol visit www.unfccc.int. Detailed rules for implementation of the Kyoto Protocol were adopted as the Marrakech Accords, which is available at www.unfccc.int/resource/docs/cop7/13.pdf.

[3] For more information on Canada's climate change plan visit www.climatechange.gc.ca.

reduction.

[5] The strategy set out in the Plan uses a mix of five policy instruments:

- innovation and technology investments by the Government of Canada;
- infrastructure investments by the Government of Canada;
- funding of partnerships between the Government of Canada and provincial and territorial governments, municipalities and communities, Aboriginal peoples, the private sector and non-governmental organizations;
- targeted measures, such as information, incentives, regulations and tax measures; and finally,
- a backstop/covenant system for large industrial emitters (LIEs).

[6] Large industrial emitters – the thermal electricity, oil and gas, and mining and manufacturing sectors – are expected to produce about half of Canada's total GHG emissions by 2010 under a BAU scenario.[4] The Plan proposes that targets for emissions reductions -- totaling 55 Mt CO_2e -- be established for LIEs through a backstop/covenant system. This is a component of the 100 Mt identified in the Plan. The covenant would be an agreement regarding emission reductions between the LIE and the federal government. The backstop will provide a "default" target for industry and cover such issues as compliance, reporting and verification. Companies will be given the option of remaining under the provisions of the backstop or entering into a covenant with the federal government. A LIE could meet its target under the backstop or a covenant in several ways – reduce its own emissions, purchase the emission reductions of other LIEs in the form of domestic permits, purchase Kyoto compliance units, and/or purchase offset credits.

[7] An offset system provides a market incentive to identify and develop projects that enhance removals or reduce emissions not covered by the backstop/covenant system. An offset is a "credit" awarded for net GHG reductions or removals achieved by a registered offset project during 2008-2012, as verified through the offset review process. An offset credit can be used for compliance with the backstop/covenant system and other purposes. In addition, it is envisioned that the government would be prepared to exchange Kyoto compliance units for offset credits as appropriate so that they could be sold internationally.

[8] Agriculture, forests and landfills are identified in the Plan as having the potential to create offset credits for new activities to reduce emissions and increase sinks. The Plan proposes that agriculture and forestry sink enhancement can generate offset credits for sink increases beyond those from existing practices. The effect of these existing practices is estimated to be 10 Mt CO_2e for agriculture and 20 Mt CO_2e for forests. The Plan also proposes consultations on whether emissions reductions from new capture and flaring or use of landfill gas should be regulated or be eligible to generate offset credits. This *Discussion Paper* addresses these

[4] A partial listing of LIEs is provided in Annex 2.

matters as part of the overall design and administration of an offset system. In addition, in the design laid out in the *Discussion Paper*, the scope of the offset system is broadened to include other sectors across the economy not covered by the backstop/covenant system for LIEs.

C. Economic Basis of an Offset System

[9] Emissions trading enables a given emissions target, such as Canada's Kyoto target, to be met at lower cost than with conventional regulations. The cost savings are possible because sources have more flexibility in the choice of emission reduction actions. Sources with low cost reduction opportunities can implement larger reductions and sell their surplus reductions at a profit. Sources with high cost reduction options can save money by purchasing surplus reductions from other participants instead. The overall emissions target is maintained but the total cost is reduced.

[10] An offset system can increase the cost savings by allowing entities with potential GHG reductions/removals not covered by the backstop/covenant system to participate in the trading program by supplying offset credits. This enhances participation in the climate change mitigation effort without increasing costs to LIEs. Entities with low-cost emission reduction/removal opportunities can earn offset credits for the emission reductions/removals achieved. Trading program participants can purchase the offset credits and use them for compliance purposes.

[11] An offset system provides offset credits for verified eligible emission reductions or removals beyond the baseline. Sale of the offset credits rewards efforts to identify and implement low-cost emission reduction and removal actions in Canada. Innovations that lower the cost of emission reductions or removals are rewarded by more offset credits and/or higher profits for the reductions/removals achieved.

[12] To fulfill this potential, there must be buyers for the offset credits. LIEs will be allowed to use offset credits for compliance with their backstop/covenant obligations. There may also be other buyers, such as public interest groups that wish to retire offset credits to benefit the environment, or the federal government that chooses to retire offset credits to achieve Canada's compliance target. Since LIEs can also use Kyoto units for compliance purposes, the price of offset credits is expected to be in line with the price of Kyoto units which will be set by international market conditions.

[13] The financial return earned by an offset project will depend upon the difference between the market price for credits and the cost of creating the credits. In addition to the cost of implementing the project, the project proponent will generally incur the cost of complying with the requirements of the offset system,

including the cost of having the project validated and the cost of periodic verification of the emission reductions/removals achieved. In the final analysis, the offset system will only function successfully if the market value of credits exceeds the administrative costs of creating them.

[14] To reduce the administrative costs, the paper proposes, where feasible, the development of standard quantification protocols for different reduction/removal offset project types. A standard quantification protocol, which defines the baseline, boundary, leakage, monitoring, reporting and quantification of emission reductions/removals, can significantly reduce the cost of validating a proposed project. Costs also can be reduced by aggregating the efforts of small entities into a large project.

An Offset System is a Policy Option

[15] The purpose of this *Discussion Paper* is to explore options for an offset system and to assess its feasibility. If an offset system is determined to be not feasible or fails to win public support, alternative approaches, including targeted measures or regulations, will be explored.

[16] All sources and sinks are expected to make a contribution to meeting Canada's Kyoto target. Where the baseline reflects targeted measures or a BAU increase in carbon sinks, credits are issued only for reductions/removals that exceed the specified contribution. In other cases an explicit contribution to Canada's target may need to be specified.

[17] In principle, an offset system stimulates innovations that increase the efficiency of emissions reductions/removals and implementation of low-cost emission reduction/removal measures. An offset system that does not restrict potential offset projects provides the maximum incentive to implement low-cost emission reductions/removals. But an offset system entails costs for both participants and the government. In practice, then, an offset system may be economically attractive for only a certain range of project types. Feedback from the consultations is expected to help identify project types for which an offset system is likely to be well suited; it may suggest that other project types might be better addressed through alternative policies. The consultations may even lead to re-consideration of whether to develop an offset system at all, relative to relying on other policy options such as targeted measures.

[18] As with any policy, care needs to be given in the design of the offset system to avoid perverse incentives. For example, it will be important to ensure that offset system design does not provide an incentives to delay implementation of economically attractive actions in order to create more credits during 2008-2012. Feedback from the consultations is expected to help identify ways of ensuring that perverse incentives are not provided.

[19] This *Discussion Paper* elaborates the principles, eligibility criteria, review process and sector-specific design issues for a possible offset system to solicit feedback from provinces/territories and stakeholders. Feedback is sought on how to design the offset system to maximize net reductions/removals while keeping the cost of the system as low as possible. The feedback will help identify appropriate roles for, and the costs to be borne by, participants, the federal government and others.

Offset System Potential

[20] As noted in the Plan, BAU sinks are estimated to be 10 Mt from agriculture and 20 Mt from forests. It is expected that landfill gas will also contribute BAU emission reductions marginally beyond their current amount of about 7 Mt.

[21] The potential for the offset system to generate emission reductions/removals beyond BAU levels depends on the varying economic costs and benefits facing project proponents. Costs arise from project development and implementation as well as the administrative costs of participation in the offset system. Benefits depend on the price of carbon and the quantity of reductions/removals resulting from the project; there may also be other benefits from the project (e.g., reduced energy costs).

[22] For forests, there currently is limited information on project costs and how they vary for different project types and conditions, although research is underway to help reduce measurement and validation costs and determine typical costs for afforestation and reforestation projects. The potential in 2008-12 will depend on timing of project activity, growth rates and offset system design. A rough estimate of potential is >4 Mt CO_2e per year beyond BAU over 2008-12; 4 Mt CO_2e per year represents a likely minimum for afforestation and reforestation projects assuming a carbon price of $10/t CO_2e. Higher carbon prices and high tree growth rates would increase the potential from forest projects.

[23] Only a rough estimate of the potential reductions/removals from agriculture is available. It is estimated that agriculture could potentially provide about 10 Mt CO_2e per year beyond BAU over 2008-12. It is expected that the majority of the 10 Mt could be achieved at a carbon price of $10-15/t CO_2e, and the remaining tonnes would come at sharply higher prices under current technologies.

[24] Studies on the costs and potential for reductions from landfill management indicate that capture and flaring can be expected to generate 8-10 Mt CO_2e per year beyond BAU over 2008-12 at a carbon price under $15/t CO_2e. Project experience has demonstrated considerable reductions available in the range of $2-6/t CO_2e. In some cases additional revenue streams from electricity generation or fuel substitution can make reductions cost effective.

[25] Given the proposed open as practical scope of the offset system, it is expected that further reductions/removals will be achieved in other sectors. Indeed, a test of the efficiency and effectiveness of the offset system will be its potential to identify and generate emission reduction/removal possibilities throughout the economy that may not currently be well known.

2 CORE DESIGN ELEMENTS

A. Legal Framework

[26] An overall legal framework vehicle will be used to give legal status to both the LIE backstop/covenant system and the offset system. To give legal status to the offset system, the following elements will be provided for.

- Recognition of offset credits as compliance units within the LIE backstop/covenant system.
- The process by which offsets can be created, including:
  - principles on which the offset system is based;
  - eligibility criteria and review requirements for verification and approval of GHG reductions and removals as offset credits; and
  - process for establishing a general guidance document and sector/project specific quantification, monitoring, verification and reporting protocols.
- International status of credits, if appropriate.
- Governance of the offset system and the responsibilities and powers of the administrative body/bodies. (See Section 3A for a detailed description of governance options.) The legislative framework used may have implications for the governance options chosen.

B. Principles

[27] The design of the offset system will be based on the following main principles:

- The design of the offset system will enhance market liquidity.
- The offset system will be as open as is practical.
- The offset system will contribute to achieving Canada's Kyoto commitment.
- The offset system will create an incentive for investment in Canada.
- The offset system will provide the appropriate economic signals.

However, it is recognized that administrative complexity must be minimized, and trade-offs may be required in implementing these principles.

1 The design of the offset system will enhance market liquidity

[28] An offset system is a market-based system that will encourage the identification and development of low cost GHG reduction and removal projects outside the backstop/ covenant system. The offset system will increase the number of participants and the supply of compliance units in the domestic emissions trading market. Clear eligibility requirements, a process for generating offsets that is transparent, efficient and consistently applied, and clarity on the ability to use, trade and bank offset credits will all facilitate development of the offset market.

[29] Through innovation, aggregation of small projects, establishment of trading platforms to bring buyers and sellers together, and participation in monitoring and verification, the private sector will play a significant role in this market. While good governance will be essential to maintain the credibility of the system, administration costs must be minimized, and the market must be left as unfettered as possible.

2 The offset system will be as open as is practical

[30] Reductions/removals of GHGs not covered by the backstop/covenant system could be eligible. An open offset system that encourages innovation in mitigation technologies and quantification technologies, and is adaptable to technological developments, will encourage effectiveness and efficiency. In general the system will not restrict eligibility on the basis of project type or project size unless this approach is determined to be impractical for policy, operational or legal reasons.

[31] An 'open' system will be complex to design and operate given the large number of projects and wide variety of project types that could be submitted for review and the need to ensure the reductions/removals are not double-counted. The costs associated with assessing projects must be kept as low as possible to maximize the opportunities for acceptable offset initiatives. Thus implementation of the principle of 'openness' must take account of the requirement to ensure the workability of the system.

3 The offset system will contribute to achieving Canada's Kyoto commitment

[32] Domestic offsets used by LIEs replace actions that they would otherwise have taken (i.e., to reduce or remove GHGs in-house or to purchase other compliance units) and so do not contribute directly to achieving Canada's Kyoto target. The offset system can be designed to make a contribution to achieving Canada's Kyoto target. This could be through the 80 Mt of actions already identified or the 60 Mt that still remains. In the case of agricultural and forest sinks, the Plan proposes that only removals beyond sink increases due to existing practices would be eligible for offset credits. Offset projects to reduce emissions (e.g., landfills) might only receive a portion of the reduction achieved beyond BAU emission reductions. Moreover, innovation encouraged by the offset system may lead to emission reductions outside the offset system and so make a contribution.

4 The offset system will create an incentive for investment in Canada

[33] The offset system will be designed to encourage the identification and development of low cost GHG reduction/removal projects in Canada. There are two ways in which this benefits Canada. First, the system will provide the

framework to create value from actions taken domestically, thereby encouraging investment in Canada relative to overseas. The second aspect is that investment in GHG reductions/removals will encourage the longer-term structural changes that will assist in moving the Canadian economy to a less carbon-intensive trajectory.

5 The offset system will provide the appropriate economic signals

[34] The economic signals provided by an offset system will be a key consideration in the assessment of design options. Providing the right signals for enhancing emission reductions and removals will be important for Canada to achieve its target in the first commitment period and to position the Canadian economy for future commitments to further reduce GHGs. Thus, for example, the offset system will be designed to create incentives for projects with long term reductions/removals as well as short term ones, and to avoid perverse incentives, such as an incentive to reverse an existing practice or to release carbon already sequestered by forest or agriculture sinks in order to later seek a benefit for these activities in the offset system. Of key importance in creating appropriate signals will be the criteria for eligibility for offset credits and methods for setting project baselines.

C. Eligibility Criteria

[35] The following criteria will be used to determine whether GHG reductions or removals are eligible for offset credits and to define how the offsets will be measured.

[36] ***1 Inclusion in the Inventory*** – The reduction/removal achieved by an offset project must be reflected in Canada's national inventory for Kyoto Protocol reporting. Reduction actions must lower emissions of one or more of the six Kyoto gases at a source that Canada is required to include in its national inventory.[5] Lower emissions from international marine and aviation bunkers, for example, are not eligible. Removal actions similarly must increase carbon sinks included in Canada's national inventory. Canada may choose to include specified sink enhancement actions, including forest management, cropland management, and grazing land management, in its inventory. If Canada chooses not to include these activities in its inventory, sinks enhancement projects on these lands will not be eligible to generate offset credits.

[37] ***2 Project Start Date*** – To ensure that the emission reductions/removals go beyond the national BAU baseline, only projects initiated after a specified 'start date' will be eligible. A definition of what constitutes the start of a project for

[5] Information on the gases and sources covered and sources currently not covered by Canada's national inventory can be found at www.climatechange.gc.ca.

the purposes of generating offset credits, such as beginning construction or the in-service date, will be required.

What should be the start date for eligible offset projects? Should the same date be used for all project types? How should the start date of a project be defined?

[38] ***3 Crediting Period*** – Only GHG reductions and removals that occur during the first commitment period will be eligible to generate offset credits. Projects that extend beyond 2012 may be eligible to generate offset credits during subsequent commitment periods, but the credits generated will be subject to the domestic and international rules for those periods. The federal government will make every effort to ensure that projects eligible to receive offset credits in 2008-12 will be eligible to generate offset credits in subsequent commitment periods.

[39] PERT, GERT and PERRL are Canadian offset pilots. Where relevant, different project start dates and crediting periods may be considered for projects that were subjected to a rigorous review and were accepted under these pilots.

How should the projects that were reviewed in the PERT, GERT and PERRL pilots be treated?

[40] ***4 Real*** – A reduction/removal is real if it stems from an identifiable project or activity that reduces emissions or increases carbon removals by a sink. Emission increases elsewhere due to a project (leakage) are deducted from the emission reductions/removals achieved at the project site. Project boundaries, baselines and leakage are discussed in Sections 4 A and 4 B.

[41] **5 *Measurable*** – Reductions/removals must be measurable, that is, both the baseline scenario and the actual reductions/removals with the project in place, must be quantifiable. The quantification methodology, including the procedure for calculating the baseline reductions/removals and the methods to be used to monitor actual emissions/removals and to estimate leakage, would be set out in a quantification protocol.

[42] **6 *Verifiable*** – The reductions/removals must be verifiable. The quantification methodology must be clear and replicable, and the raw data required to verify/audit the calculation must be available to the appropriate authority.

[43] **7 *Surplus*** – GHG reduction/removals must be surplus to generate offset credits. There are two elements to the surplus requirement:

(a) The reduction/removal, or the activity that causes it, exceeds the level that might reasonably be expected will be achieved due to another government climate change measure.

(b) The reduction/removal, or the activity that causes it, is not required by an existing federal/provincial/local regulation or operating certificate. Provincial or local regulation varies across the country so activities that are eligible to generate offset credits in some jurisdictions could be ineligible in others. Reductions/removals under a voluntary agreement may not be eligible if the agreement is comparable to a regulatory requirement.

[44] **8** ***Unique*** – A GHG reduction/removal is unique if it is only used once (e.g., a GHG reduction/removal cannot be reported as an improvement in the seller's GHG inventory and also sold to another entity as an offset credit for use in meeting a compliance obligation). The main mechanisms for ensuring that GHG reductions/removals are not used more than once for compliance will be implementation of the surplus requirement and unique serial numbers on offset credits.

[45] **9** ***Ownership*** – The project proponent creating offset credits must ensure that all potential claims to ownership have been identified, and have secure and transparent ownership rights to the GHG reductions/removals they are claiming. There are two main approaches to ensuring clear ownership of reductions/removals:

(a) definition of ownership in the rules for the offset system, and

(b) private contractual arrangements with recourse to the court system as a backstop.

Ownership will need to be carefully defined for reductions/removals that are supported by government assistance.

What is the preferred approach to ensuring clear ownership of emission reductions/removals?

What project types do you think would be suitable as offset projects? What is the annual emission reduction/removal potential for such projects in Canada? Could other approaches achieve these reductions at lower cost?

D. Links with the International System

[46] The design of the domestic offset system will be driven by domestic policy objectives. At the same time, two international Kyoto mechanisms -- the Clean Development Mechanism (CDM) and Joint Implementation (JI), allow the creation of international Kyoto compliance units for emission reductions/removals, and so provide guidance in the design of the offset system.[6]

[6] For more information on the Clean Development Mechanism and Joint Implementation see the Department of Foreign and International Affairs, Clean Development Mechanism/Joint Implementation Office website at www.dfait-maeci.gc.ca/cdm-ji/menu-en.asp.

[47] CDM projects can be hosted in developing countries only, whereas JI projects can be hosted by any Annex 1 Kyoto Party (generally, developed countries that have ratified the Kyoto Protocol). JI is more relevant to the design of the offset system since it applies to emission reduction and removal projects in Annex 1 parties including Canada. The rules for JI projects allow the host country to develop its own review process for the reductions/removals achieved by those projects.[7] JI projects earn Emission Reduction Units (ERUs), which can be used by LIEs for the purpose of achieving compliance with the backstop/covenant system or be sold internationally. Since many projects could qualify as either a JI or an offset project, the rules for JI projects hosted in Canada should be at least as stringent as those for offset projects.

[48] Offset credits will be domestic units, not international Kyoto compliance units. However, both offset credits and all international Kyoto compliance units can be used by LIEs for the purpose of achieving compliance with the backstop/covenant system. Thus, offset credits can be expected to trade at par with Kyoto units in the Canadian marketplace. In addition, it is envisioned that the government would be prepared to exchange Kyoto compliance units for offset credits as appropriate. However, if temporary offset credits are issued for sinks projects, these would not correspond with permanent Kyoto compliance units. The possible role of temporary offset credits is discussed in Section 4 C. Another issue is that offset credits may be issued on a different schedule than Kyoto compliance units.

[7] The rules for JI also allow the host country to use an international approval process similar to that for the CDM.

3 ADMINISTRATION OF THE OFFSET SYSTEM

A. Offset System Governance

[49] The governance of the offset system could follow a variety of models. The Program Authority (or Authorities) responsible for the administration of the system could be a federal body, a federal/provincial/private sector body, or a private sector/provincial body with federal government oversight. Factors to be considered in choosing the governance structure include cost, efficiency, ability to ensure consistent outcomes, provincial/territorial and private sector interest, etc.

[50] The legal framework may impose some restrictions on the governance model adopted. For example, the federal government may be required to give final approval for the issuance of offset credits. Further, it may be necessary to identify the responsible body(ies) in the legislation, or it may be sufficient to provide only the criteria to be used for the identification and designation of the responsible body(ies).

[51] The design and implementation of the offset system will involve four main functions:

1 Design of Offset System

[52] The initial design work is being undertaken by the federal government working with the provinces/territories to seek their input on the design. In addition, stakeholders will have numerous opportunities to provide input into the design through consultations, bilateral meetings, written submissions and other interactions. The on-going adjustment of the offset system, including the addition of standard quantification protocols, will likely follow the same approach. (Quantification protocols are discussed in more detail later in this section.)

2 Review Process

[53] The three phases in the review process include:

(a) Validation of proposed projects by the Program Authority, drawing on sector experts where needed.

(b) Verification of emission reductions/removals by accredited verification entities or by the Program Authority.

(c) Final approval of emission reductions/removals and issuance of credits by the Program Authority to ensure that offset credits used by LIEs for compliance purposes meet the requirements set out in the legal framework supporting the LIE backstop/covenant system.

3 Dispute Resolution

[54] The Program Authority will need to provide for dispute settlement mechanisms to manage any disputes that might arise.

4 Offset System Registries

[55] The offset system will need to store information on all aspects of projects and project reviews and to track ownership of the offset credits (see Section C). The offset project registry or registries could be operated by the federal government, one or more provincial/territorial governments or designated private entities.

What is the appropriate structure and composition of the Program Authority?

B. Review Process

[56] The most important administrative functions in the offset system are the review of offset projects, the review of the reductions/removals achieved by these projects, and the issuance of offset credits. A proposed three-phase review process is summarized below. Figure 1 summarizes the review process phases, activities and responsibilities. A number of small projects that share a common methodology could go through the review phases together if desired by the project proponents.

Guidance for Proponents

[57] The legal framework gives legal status to the offset system. Among other things, it provides for the process by which offset can be created.

[58] A guidance document will provide a generic but detailed outline (and examples) of how GHG emission reductions and removals must be quantified and reported to conform with the offset system eligibility criteria. All application and reporting forms and a detailed description of each step involved in the review process will also be provided. The guidance document will be updated as system improvements are identified.

[59] The quantification protocol will provide detailed information on the methodology for quantifying GHG reductions/removals (including the baseline, boundary, leakage) for a specific project/project type. It will also set out monitoring and reporting procedures. The quantification protocol for a registered project could be used as a precedent for other projects of the same type to reduce their project preparation costs and to expedite the registration process. These standard quantification protocols will be incorporated/referenced in the guidance document.

Phase 1 - Ex Ante Validation of Projects

[60] *Submission of the Project Document*

- The proponent develops (at own expense) a project document that describes the project and addresses each of the eligibility criteria, including full documentation of the baseline, project boundaries, leakage, and monitoring plan. The project document also includes transmittal letters and any relevant legal agreements (e.g., documents related to ownership).

- The proponent can use a standard quantification protocol where one is available for the project type being proposed. If adjustments are required to the standard quantification protocol to meet the circumstances of the project, these adjustments must be justified in the project document to the satisfaction of the Program Authority.

- Where a standard quantification protocol is not available, the government may provide assistance for the development of new quantification protocol, both to encourage the development of innovative low-cost projects and in recognition of the cost and potential value of developing standard quantification protocols. Any quantification protocol approved by the Program Authority becomes a precedent and can be used with subsequent projects.

Should government support be provided for the preparation of a quantification protocol for a new project type? If so, what type and level of support would be appropriate?

[61] *Review and Validation of the Project Document*

- The Program Authority reviews the project document against the eligibility criteria and other requirements of the offset system to ensure that all the conditions for the creation of an offset that are set out in the legal framework, guidance document and relevant protocol would likely be met. The proponent may be requested to provide additional information to support the review.

- Project reviews may be channelled into two streams. The first stream will be for projects where a standard quantification protocol has been accepted and incorporated into the guidance document, either directly or by reference. The reviews for such projects should be relatively straight forward. The second stream, for projects where no standard quantification protocol has yet been published, may be more detailed and iterative. The more resources that can be

devoted to this stream, the greater will be the ability of the offset system to encourage innovative reduction/removal projects.

- If the Program Authority validates that all the eligibility criteria and other offset system requirements have been met (are expected will be met), the project can be registered.

[62] *Registration of the Project*

- The Program Authority registers the project. All methodologies/information required for the quantification, monitoring, verification, and reporting of reductions/removals from the project are sent to the Offset Project Registry where non-confidential information isavailable for public review. The project is now eligible to generate offset credits during the crediting period.

Phase 2 - Ex Post Verification of GHG Reductions and Removals

[63] *Monitoring and reporting of reductions/removals*

- The project proponent is responsible for monitoring GHG reductions and removals from the project and preparing annual or periodic reports on these reductions/removals, according to the plan set out in the project registration documentation.

- The project proponent submits the emission reduction/removal report to the Program Authority or to an accredited verification entity (independent third party).

[64] *Verification of reductions and removals*

- Verification of reductions/removals may occur at intervals (e.g., annually) over the 2008-2012 crediting period or once at the end of the crediting period. This choice would be made by the project proponents.

- The Program Authority or accredited verification entity reviews the information provided by the proponent to confirm that all the requirements outlined in the project registration documentation have been met.

- The Program Authority recommends the number of offset credits to be awarded, based on the information submitted by the proponent and confirmed by the accredited verification entity or the Program Authority.

Who should be responsible for verification – the Program Authority or accredited verification entities?

Phase 3 - Issuance of Offset Credits

[65] *Final approval of reductions and removals*

- Final approval of the reductions/removals achieved by the project is the last step in the review process.

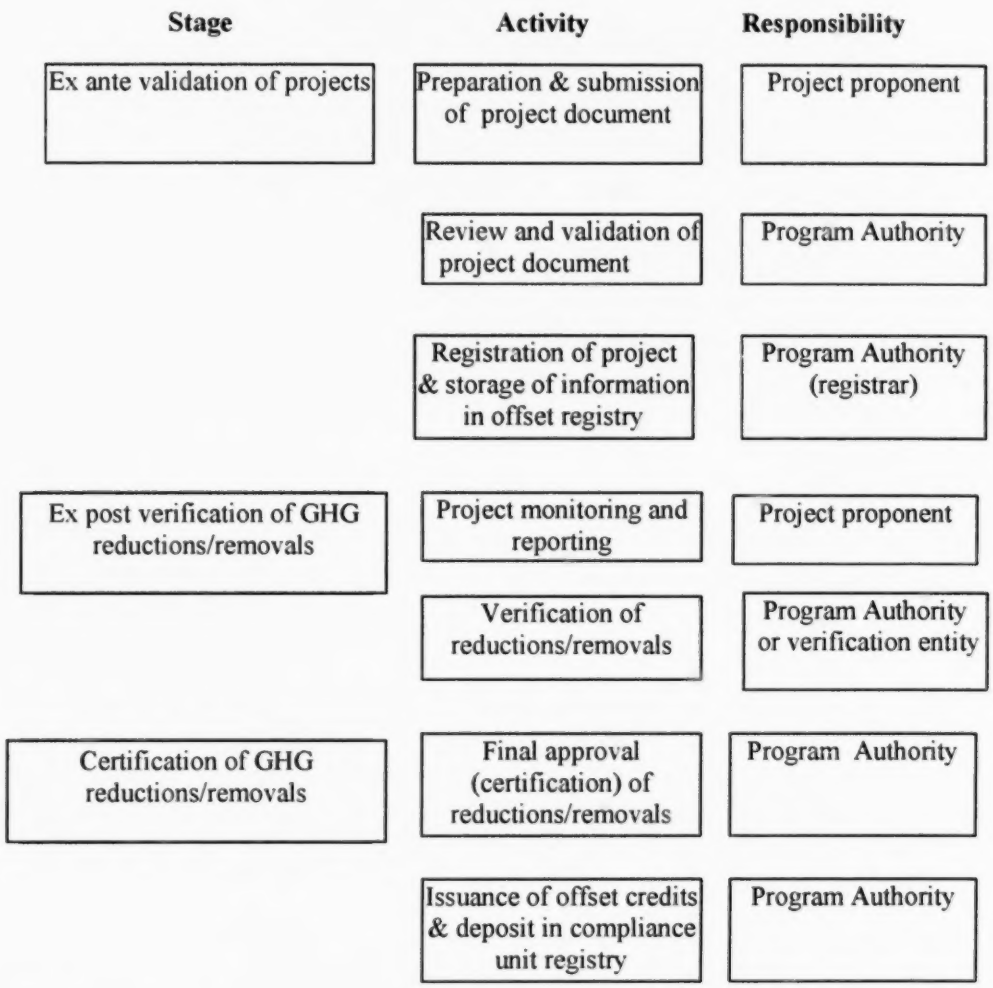
[66] *Issuance and deposit of credits*

- Offset credits are issued by the Program Authority with serial numbers that allow easy identification of the project, project type, and year of reduction/removal.

- Offset credits are deposited by the Program Authority to an account(s) in the compliance unit registry as directed by the project proponent.

- All non-confidential documentation related to the generation of offset credits is sent to the Offset Project Registry and is available for public review.

[67] **Figure 1 - Review Process**


Stage
Activity
Responsibility
Ex ante validation of projects
Preparation & submission of project document
Project proponent
Review and validation of project document
Program Authority
Registration of project & storage of information in offset registry
Program Authority (registrar)
Ex post verification of GHG reductions/removals
Project monitoring and reporting
Project proponent
Verification of reductions/removals
Program Authority or verification entity
Certification of GHG reductions/removals
Final approval (certification) of reductions/removals
Program Authority
Issuance of offset credits & deposit in compliance unit registry
Program Authority

[68] The process described above results in the ex post issuance of credits. Under this process, offset credits could be issued no earlier than 2009 (for offsets generated in 2008). However, it may be desirable to consider mechanisms that provide an earlier revenue flow for project proponents and enhance liquidity by advancing the date at which credits are available. An options/futures market – through bilateral contracts or purchase of financial derivatives – can advance revenue to project proponents. This mechanism would be provided by the private market and consequently raises no design issues for the offset system. However, only offset credits that have been issued (i.e., are available on the spot market) could be used for compliance in the backstop/covenant system.

[69] A second mechanism could be the early issuance of offset credits, based on the estimated generation of reductions/removals from registered projects in the 2008-2012 crediting period. The design of this mechanism would need to address issues related to the risk of non-delivery, and dates for issuance and true-up. Restrictions on the use of these offset credits prior to this true-up (if any) would have to be clarified.

Should offset credits be issued early? How should the risk of non-delivery be addressed?

C. Registries

[70] Two kinds of registries are required for the offset system:
- a registry for tracking ownership and transfers of compliance units, and
- a registry for storing information on each offset project.

Neither registry matches potential buyers and sellers, provides a mechanism for buying or selling credits, or provides information on the price of credits.

1 Compliance Unit Registry

[71] Canada is required to maintain a National Registry to track ownership and transfers of Kyoto compliance units. Canada will also need to track ownership and transfers of domestic compliance units, including offset credits. The offset credits could be tracked in an expanded National Registry or in a separate domestic registry. In either case, the numbering system for compliance units will be designed to allow a purchaser to track a compliance unit back to the project that created the offset credit.

[72] Each LIE that wishes to use offset credits for compliance with its target and each offset project proponent must have an account in the appropriate compliance unit registry. Each account will show the offset credits owned by that organization by serial number. When offset credits are sold they are transferred from the account of the seller to the account of the buyer. When offset credits are used for compliance purposes by an LIE they are transferred to the appropriate retirement account. The categories of information in the registry that will be available to the public will need to be determined.

2 Offset Project Registry

[73] The Offset Project Registry will store information related to individual offset projects, including:
- project document, including the accepted quantification protocol;
- risk management plan for sink projects (see Section 4C);

- emission reductions/removals reports, including verification reports; and
- standard protocols.

[74] The Offset Project Registry is intended to improve the transparency of the offset system by providing public access to information on projects. Any limits on access will need to be carefully defined.

[75] The Offset Project Registry would also be used to track the project review from submission of the Project Document to issuance of offset credits by the Program Authority.

D. Market Structure

[76] The need for a liquid market in GHG compliance units argues for a system in which domestic trading of offset credits is integrated with trading of permits allocated to LIEs and with other mechanisms for transactions involving Kyoto compliance units. Once issued, the trading price of domestic offset credits would therefore normally be set by international market conditions.

[77] The market – or trading mechanism – for domestic offset credits can take a variety of forms. Institutionally, trading in permits and offset credits could occur through bilateral contracts (over the counter trading) or exchange-based trades. As well, transactions could be for immediate delivery (the spot market) or for future settlement.

[78] One view is that the development of a domestic market in GHG compliance units is best left to the private sector and to market forces. However, the federal government would have to assume responsibility for setting out the basic trading rules to minimize uncertainty for market participants.

4 DESIGN ISSUES

A. Baselines

[79] The baseline is used to determine the quantity of the emission reductions or removals to be credited to a project, and so contributes to the effectiveness and efficiency of the offset system in meeting Canada's target in an equitable manner. If financial benefits are diverted to reductions/removals that would have occurred anyway, the overall cost of meeting Canada's target will be increased. A project baseline is a scenario that reasonably represents the anthropogenic GHG emissions by sources and removals by sinks that would occur in the Commitment Period in the absence of the project activity. Emission reductions credited to the project are calculated as the difference between the project baseline and actual emissions from project activities. Emission removals are calculated as the actual carbon stock changes less the baseline carbon stock changes. (The discussion in this section refers only to carbon stock changes but projects will have to account for both the carbon stock changes and emissions from non-CO_2 gases.)

[80] Five principles for design of the offset system are set out in Section 2B. The approach to baselines should reflect these principles, so that the system enhances market liquidity, is as open as is practical, encourages domestic investment, provides appropriate economic signals and contributes to achieving Canada's Kyoto commitment.

[81] Market liquidity and domestic investment will be enhanced by baselines that:

- are straightforward and cost-effective for proponents to develop;
- are applied consistently across similar projects;
- minimize investor risks;
- are transparent and straightforward for verifiers to confirm; and
- encourage the development of standard protocols that can be applied to a number of projects.

[82] An open offset system that creates incentives for domestic investment will allow the use of baselines that reflect specific project circumstances to encourage innovation and a wide range of projects. This means that a variety of possible approaches could be used to set baselines, depending on the sector and project. Some of these approaches are discussed in more detail below.

[83] The offset system will contribute to achieving Canada's Kyoto target. For some project types a direct contribution has already been accounted for in the *Climate Change Plan for Canada* and no further contribution may be required. For example, the Plan identifies the estimated BAU sink contribution as 10 Mt CO2e sink contribution from agriculture and 20 Mt CO2e from forests, and proposes that agricultural and forest removals beyond BAU would be eligible for offset credits. For other project types this contribution could be made through a baseline

adjustment, the retirement of a portion of the offset credits generated by the activity or through other approaches.

[84] Baselines will generally reflect BAU actions if they reasonably represent the reductions/removals that would likely have occurred in the absence of the project. Therefore, baselines should reflect reductions/removals required by regulation/operating certificate or that are the result of other government climate change measures. Baselines may require updating to reflect significant changes in project circumstances. This approach shold help to ensure that the system provides appropriate economic signals to enhance reductions/removals beyond current practices.

[85] A conservative approach to baseline assumptions and methods could be used to help ensure the offset system does not overstate project reductions and removals. This would involve selecting from the lower end of the range of estimates where different assumptions yield a range of estimates for reductions/removals.

[86] Establishing baselines will involve judgement on the part of proponents and the Program Authority, and tradeoffs among the three design principles may be required. For example, an open system that encourages innovative projects will likely require the use of baselines that are specific to project circumstances. However, project-specific baselines may require significant resources to develop and review, and the associated increased transaction costs may discourage investment and reduce market liquidity.

[87] Standard baseline approaches (quantification protocols) will apply to most projects. If a proponent chooses to propose an alternative baseline methodology, the proponent will need to demonstrate to the satisfaction of the Program Authority that the proposed approach provides the most reasonable representation of the reductions/removals that would likely have occurred in the absence of the project.

[88] Once a protocol has been approved for a specific project it could become a standard protocol that can be used by similar projects. Possible approaches to developing baselines for agriculture, forest and landfill projects are discussed in more detail in Section 5. The following general methods will provide the basis for these standard quantification protocols, and should also be considered by proponents proposing alternative methodologies to estimate baselines.

- Historical/current situation The baseline scenario could be constructed to reflect reductions/removals in a base period, for example average emissions between 1990 and 2000. This historic benchmark approach assumes that past trends in emissions and/or carbon stock changes will continue in the future. This approach is straightforward and provides certainty for investors.

- Comparison approach A comparison to recent, similar project activities could be made. For example, the CDM guidelines suggest using an average of similar projects undertaken in the previous five years, in similar social, economic, environmental and technological circumstances, and whose performance is among the top 20 per cent of their category.

- Control group A control group sets the baseline using a monitored sample of similar facilities, land plots or other situations outside the direct influence of the project. This approach assumes that activity at these representative sites will reveal what would have happened in the absence of the activity at the project site, and may be useful where future outcomes are highly uncertain. A control group approach may be applicable to some forest and agricultural projects.

- Forward–looking scenarios Projections of reductions/removals in the future can use a variety of techniques, from simple straight-line growth assumptions to complex models. Forward looking scenarios can be specified in terms of a set of constant parameters or can vary over time according to some pre-defined procedures. A forward-looking approach will be required where the project prevents or avoids emissions that would otherwise have occurred, particularly from new sources. Examples of projects or activities that avoid emissions include activities to prevent deforestation, forest fires or disease.

- Regional Average A forward-looking scenario that is standardized and based on regional data could be applied to all similar offset projects in a given area. For example, average 'without-projects' rates of sequestration could be forecast for a given region over the commitment period from aggregate statistical and modelling information.

[89] Baseline approaches differ in terms of whether and when the baseline must be revised to reflect new information, such as changes to regulations. Approaches that monitor other, similar projects (control groups) on an ongoing basis can fully reflect new information and changes in circumstances. Forward-looking baselines (whether constant or time-varying) can be either fixed at the project registration phase or revised periodically. Any revisions would only apply to the baseline from that point forward and would not apply retrospectively. While periodic revisions may result in a more reasonable representation of reductions/removals in the absence of the project, revisions will also increase transactions costs and reduce certainty for investors.

[90] If a project extends beyond 2012, it may be eligible to create credits after that date. However, eligibility will be subject to the domestic and international rules for those periods. As well, the baseline for the post-2012 period may be revised to reflect technological developments, commercial practices and new policies.

B. Boundaries and Leakage

[91] The project boundary identifies the reductions/removals that are included in the determination of offset credits. The project boundary must be clearly defined and encompasses all anthropogenic GHG emissions by sources and removals by sinks under the control of the project proponents that are significant and reasonably attributable to project activity. Project boundaries need to be defined in terms of geographical area and in terms of the project processes and activities responsible for direct and main indirect GHG emissions. Temporal boundaries, which include the project start date and crediting period, are discussed elsewhere in this paper, as is the related issue of non-permanence of sinks projects.

[92] The offset system will provide guidance on the specification of a project boundary, and on the identification, monitoring and management of leakage. This guidance could cover all offset projects and/or be specific to a particular project type. Table 1 summarizes how different categories of reductions/removals (direct and indirect, onsite and offsite) could be treated in an offset system.

[93] For emission reduction projects, the boundaries should include on-site fuel use and process emissions and on-site indirect effects if they are significant. Offsite reductions that are significant, under the control of the proponent and reasonably attributable to the project could also be included in the boundary. For example, a landfill gas project that sells captured methane to an offsite greenhouse could define its boundary to include the reductions in fossil fuels emissions at the greenhouse. However, the project proponent will need to be able to demonstrate the ownership of any offsite reductions included in the proposed project boundary.

[94] Emissions associated with purchased electricity will be primarily captured by the LIE backstop/covenant system, and would not be included in the project boundary or leakage.

[95] For agricultural and forest sink projects, spatial boundaries must be clearly defined to facilitate accurate monitoring, accounting and verification. Spatial boundaries can be in the form of clearly defined physical facilities or sites, topographic descriptions, permanent boundary markers, geographic positioning system (GPS) located boundaries, and/or other methods. These spatial boundaries need to be legal boundaries that are recognized by federal and provincial/territorial governments and stakeholders.

[96] Leakage is an increase in emissions or decrease in removals outside a project's boundary resulting from the project's activities. Leakage is associated with changes in reductions/removals that are significant and reasonably attributable to

the project, but are not under the control of the proponent. While leakage can also be positive, offset credits cannot be claimed for net positive leakage. If positive leakage is detected and quantified, it can be used to reduce the negative leakage.

[97] Leakage can occur through two principal mechanisms - activity shifting and market effects. Activity shifting occurs when a project affects an activity outside the project's boundaries. Market effects result from the impacts of a project on the supply or demand for project outputs or inputs, causing an increase/decrease in emissions/removals elsewhere. The geographical scope of the leakage could be confined to the vicinity of the project, or it could be provincial, national or international in scope. Project proponents will not be required to assess leakage at the international scale.

[98] Defining project boundaries to manage leakage may be important for forest and agriculture projects. The project's spatial boundary should be a clearly defined area where the activity (e.g., afforestation) takes place plus any areas on which related infrastructure development takes place (e.g., construction of roads leading into an area where afforestation is to occur).

What is the appropriate definition of a project boundary and what sources of leakage should be identified and monitored?

[99] **Table 1 - Inclusion of Reductions/Removals within Project Boundaries**

Reduction/removal	Examples	Included in project boundary
Direct, onsite	• project fuel use, process emissions	• yes
	• onsite sequestration	• yes
Direct, offsite	• sales of captured landfill gas to a greenhouse to displace purchased fossil fuels	• yes
	• renewable electricity projects	• no - captured by LIE backstop/covenant system and/or other programs
	• reductions in purchased electricity	• no - captured by LIE backstop/covenant system and/or other programs
Indirect, onsite	• increase in heating demand due to energy retrofit	• yes - if significant and not covered by other government climate change measures
Indirect, offsite	• project impact on market demand/supply	• no - not under proponent control. Addressed separately as leakage
	• activity shifting – e.g. deforestation	• no - not under proponent control. Addressed separately as leakage

[100] Once a project's potential leakage has been assessed, a procedure for monitoring and estimation must be determined. The monitoring methodology will be a function of the nature and geographic scope of the potential leakage. It may involve monitoring specific sources or sinks in specified locations. Or it could involve monitoring indicators of demands that lead to carbon emissions (such as demand for timber, fuelwood, or agricultural land). Leakage may need to be monitored at the local, regional, or the national level.

What is the most efficient and workable method for accounting for leakage in the quantification protocol?

C. Addressing the Non-Permanence of Removals Projects

[101] Removals via sinks differ from emission reductions in that they are not permanent. Carbon in forests or agricultural soil sinks is vulnerable to "non-

permanence or reversal events" by natural disturbances such as pest outbreaks, wildfires and disease outbreaks, or anthropogenic practices such as forest harvesting, soil cultivation and other land management practices. These disturbances can cause either partial or total loss of the carbon stock in an area that formerly functioned as a sink, thus emitting previously stored carbon into the atmosphere.

[102] Reversal of carbon sequestration can occur at any time during a project. A reversal that occurs prior to credit issuance is of concern to a buyer that has purchased credits for future delivery that now may not be delivered. It is also of concern to a seller since it will not receive the anticipated revenue from the sale of the credits. A reversal that occurs prior to credit issuance does not affect the integrity of credits issued by the offset system. However, the emissions would enter the national accounting and increase the burden on other sectors of the economy.

How should reversals prior to an offset credit issuance be addressed?

[103] A reversal for which offset credits have already been issued could have been used by a LIE buyer to meet its obligations but the underlying carbon has not remained sequestered. Unless the offset system includes a mechanism to ensure that buyers or sellers are responsible for any reversals of sinks offset credits issued, the burden of addressing a reversal will be transferred to other sectors of the economy while the buyers and sellers of the credits benefit from the use and sale of the credits.

[104] Two issues arise here. One is the question of where liability for a credit reversal should fall. Who should have to account for a credit reversal – the buyer, the seller, or the economy as a whole? The other is the issue of how long carbon must remain sequestered to be considered equivalent to an emission reduction. Periods of 25 to 100 years have been suggested. Scientific considerations suggest longer periods while economic and policy feasibility considerations suggest shorter periods. This issue has been discussed internationally, but will not be settled soon, so a domestic policy decision would likely be needed.

Who should have liability for carbon sink reversals for which offset credits have been issued?

How long must carbon remain sequestered to be considered equivalent to an emission reduction?

Risk Management

[105] Risks of non-permanence can be managed through identification of likely risks and development of a risk management strategy at the design stage. By assessing and addressing the probability related to reversal events, a project could in a

sense self-insure itself by admitting that some reversals will occur and building that into the overall design. Risk management approaches could include pooling of individual projects into a project portfolio, geographic dispersion of elements of a project, fire/insect/disease monitoring and prevention programs, credit reserves, and buffers (e.g. not seeking credit for all eligible emission reductions/ removals).

[106] A risk management plan will be a requirement for all sink projects. These plans will need to identify the major risks of reversal and specify how these risks will be mitigated. The choice of the risk management strategy will be left to project proponents. The risk management plan will be subject to review as part of the project validation process. Project verification would include verifying implementation and performance of the risk management plan.

[107] Implementation of a risk management strategy for a project will reduce the risk of carbon reversal but such events could still occur. One option for dealing with non-permanence is to rely on the risk management strategy to reduce the risk to an acceptable level, with government (economy as a whole) assuming liability for any reversal not covered by self-insurance measures put in place as part of the risk management strategy. Requirements for risk management plans would need to be strict since project developers would have less incentive to ensure a carbon reversal does not occur when they are not liable for the reversal.

Would a strict requirement for a risk management plan be an appropriate way to address non-permanence?

[108] Alternatively, several other options are available to address non-permanence in addition to the requirement for development and implementation of a risk management strategy. These include:

- accounting approaches that explicitly take into account the risk of future reversals
- partial and time delayed crediting
- insured credits
- required replacement
- temporary credits

1 Alternative Accounting Approaches

[109] National accounting for sink activities must be done by estimating actual changes in carbon stocks during the commitment period on the areas subject to those activities. Other accounting approaches have been suggested, and they could help address concerns about non-permanence when applied to projects. For example, the long term averaging approach attempts to take into account all likely

emissions and removals over a long period and calculates the average sequestration over that period. This average is then used as the basis for project credits. As well as helping to address non-permanence, this accounting approach can have economic advantages for some types of sinks projects because it could allow earlier crediting. However, the possibility that future carbon reversals will not be accounted for remains.

[110] Because projects in a domestic offset system will be required to base credits on actual carbon stock changes consistent with Kyoto Protocol national level accounting, these other accounting options will not likely be permitted.

2 Partial and Time-Delayed Crediting

[111] While sinks project accounting will be based on actual carbon stock changes one way to deal with non-permanence is through partial or time-delayed crediting of the measured carbon stock changes. As mentioned above, project developers could voluntarily seek only partial credits as part of their risk management strategy. It is also possible for the offset system to establish a rule for partial crediting. Offset credits would be issued for only part of the net removals achieved. The remaining removals (credits not issued) would be equivalent to an insurance premium collected by Canada to compensate for reversals. How to establish the appropriate portion of removals to be credited is not clear.

[112] With time-delayed crediting, the risk of reversal would be addressed by issuing credits only after a sufficient period has passed for the sequestration to yield a long-term benefit to the atmosphere. For example, if the sufficient period were established as 100 years then credits would be issued only after 100 years. Such an approach means there would be little or no interest in sink projects unless a short period was used.

[113] Another possibility is tonne-year crediting. If the sufficient period were set at 100 years, then 100 tonnes sequestered for 1 year (or 20 tonnes for 5 years) would receive an offset credit for 1 tonne, which could then be used to offset 1 tonne of emissions. If the carbon remains sequestered then the following year another offset credit for 1 tonne would be issued, and so on. The appropriate period would need to be established in the offset system rule. This approach also poses a significant disincentive to project developers, as the developer would only receive credits for a small fraction of the removals created each year.

If a tonne-year equivalence approach is used, how many tonne-years should be considered equivalent to a permanent reduction?

3 Insured Offset Credits

[114] This approach would require a project proponent to purchase insurance for replacement of offset credits if the underlying carbon is released. When a reversal event occurs, any offset credits for which the underlying carbon is released would be cancelled and the insurance company would be responsible for replacing the cancelled credits with credits valid in the domestic trading system within a specified period.

[115] The key issue for this approach is the period for which insurance must be purchased. Once the insurance period is set the project would have to be monitored for reversals over that period. After that period, neither the seller, buyer, nor insurer would have further liability. The insurer assumes the liability for a fee during the insured period, with Canada as a whole being responsible for reversals if the insurer fails before the period ends. Other key design issues include the process for review of adequacy of insurance, notification of losses, loss assessment and replacement of cancelled credits, and responsibility in the event the insurer does not replace all of the cancelled credits.

[116] An insurance approach creates a strong economic incentive to develop and implement a good risk management plan to reduce the cost of insurance, for example by combining with some of the self-insurance strategies discussed above. An insurance approach is especially suited to projects with little risk of reversal and/or with a desire to maintain the carbon for a very long period (e.g. afforestation/reforestation for permanent habitat or riparian protection purposes). The need to monitor insurance coverage and reversals adds to transaction costs.

If the insurance approach were to be used, how long should the insurance period be?

What would constitute adequate insurance coverage, and would such coverage be offered commercially at a price that would enable sink projects to be viable?

4 Required Replacement

[117] This approach would require a project proponent to accept liability for a period of time to replace credits if a carbon reversal occurs. In many cases insurance could be obtained but it is non-mandatory, and so this approach would the same as the insurance approach in these cases. However, insurance might only be available to cover the possibility of unintended losses in carbon, such as through fire or insect infestation. Some projects may involve planned harvesting in the future and it is unlikely that insurance would be available for these planned future losses in carbon. This would be the case with afforestation projects in which trees are planted with the intent of later harvesting. When the harvesting occurs, the project proponent would need to take action to preserve the integrity

of the outstanding credits, for example through the purchase of replacement credits.

[118] As with insurance, the key issue for this approach is the period over which the project proponent must accept the liability for replacement. In the case where a future reversal is part of the project planning and insurance is not obtained, the project proponent would be able to plan for the need to supply replacement credits in the future. This could be done through financial planning and investment to ensure that finances will be available to purchase replacement credits. Careful planning of planting and harvesting schedules could also minimize or prevent any future reversals by ensuring future annual emissions from harvesting some parts of the project area are balanced by future annual sequestration from growth on other parts.

5 Temporary Offset Credits

[119] Credits issued under this approach would be valid only for a specified period of time, such as five years. Five years is the length of the commitment period and a reasonable interval for repeated measurement of carbon stocks. Each 5-year temporary credit would represent carbon that has been sequestered for at least 5 years prior to the date of issuance of the credit, and it would be automatically cancelled on its expiry date.

[120] A new verification will show how much carbon has been sequestered by the project at that time and new temporary credits equal to that quantity will be issued. Thus if the stocks have been maintained or increased during the previous five years, the temporary credits would be issued again for a further five years. If there had been a partial (complete) reversal then fewer (no) temporary credits would be issued. This approach guarantees that reversal will be accounted for with a delay of, at most, five years.

[121] When the temporary credit is cancelled upon expiry, the LIE that used the credit to offset emissions would need to replace it with an equivalent permanent emission reduction (i.e. internally in its own operations), purchase a permanent emission reduction credit or permit elsewhere in the trading system, or purchase another temporary offset credit. In effect, a temporary credit gives the buyer a temporary permit to emit. Temporary credits may be useful to LIEs that expect to have internal opportunities to reduce emissions in the future as technology is developed and/or normal capital investment cycles result in replacement of existing machinery with lower GHG-emitting machinery.

[122] This option allows the risk of reversal, and the associated liability, to be managed over agreed time periods by the market participants. Once credits expire, sellers have complete flexibility to re-establish a credit or change their activities on the project land, and buyers can look at different options to meet their obligations in a

cost effective manner. Sellers can always decide to change their activities, resulting in emissions of carbon and the country as a whole would have to account for these emissions. However, this would not present a problem in terms of the validity of credits as the 5-year temporary credits are based on carbon that has already been sequestered for the 5-year period.

If temporary credits are used, should the validity period be fixed or variable, how long should it be, and should it be set to coincide with the commitment periods?

[123] Allowing a variety of approaches to address non-permanence would provide market participants with the flexibility to choose the approach that best suits their needs.

Which approach(es) to addressing non-permanence should be accepted by the offsets system? If more than one approach is allowed by the rules, should the choice be left to the project proponents or be specified by the rules based on the project type

5 APPLICATION OF THE PROPOSED FRAMEWORK TO SELECTED SECTORS

A. Forests

1 Eligible Projects

[124] Canada must account for the carbon stock changes in the commitment period resulting from afforestation, reforestation and deforestation (ARD) that have occurred since 1990. Canada can choose whether it wants to include forest management in its accounting in the first commitment period, with the decision to be made no later than 2006. If Canada chooses to include forest management the contribution of these activities to meeting Canada's commitment is capped.[8]

[125] Thus, afforestation and reforestation projects will be eligible to generate offset credits. Projects that avoid emissions that would otherwise result from deforestation could also be eligible because these projects would reduce the emissions that Canada would have to account for. Forest management projects will be eligible to generate offset credits only if Canada elects to include forest management in its national accounting. Forest management projects could either increase sequestration or reduce emissions, for example by reducing emissions associated with harvesting or natural disturbance. Particular care may need to be taken with development of appropriate baselines for avoided emission projects.

[126] *Do avoided emission forest projects raise special or particularly difficult issues, for example with respect to baselines and leakage? Are there reasons to not include these projects in an offset system?*

[127] Current estimates suggest that the area subject to forest management will be a sink, although there are risks, reflecting the unpredictable nature of fires and some insect disturbances. If Canada decides to include forest management in its accounting and the managed forest becomes a net source due to such events, Canada will be required to account for these emissions, making our target more difficult to achieve. Therefore better information needs to be gathered before Canada can make the decision to include forest management. Since that choice might not be made until late 2006, the offset system will be designed to include such projects even though they may subsequently be excluded.

[128] Forest projects must clearly involve "forest" as defined in the Marrakech Accords. The definition involves three parameter choices that Canada must make by 2006. One parameter is area and the minimum area to qualify as forest in

[8] An explanation of the international sinks accounting rules in the Marrakech Accords is available as part of the material on the offsets consultation at the Government of Canada Climate Change website (www.climatechange.gc.ca).

Canada will be set at 1 hectare. Decisions have not yet been made on the other two parameters but for the purposes of project design developers should assume that an area would only be considered forest if it has a minimum crown cover of 30% and a minimum potential tree height of 5 metres.

[129] Sinks projects have to account for all ecosystem carbon pools in the baseline and with the project. Leakage must be considered. The pools are above and below ground biomass in trees and other vegetation, litter, dead organic matter and soil organic carbon. The projects must also account for the non-CO_2 gases specified in the Kyoto Protocol. For sinks projects the important non-CO_2 gases are methane and nitrous oxide. For convenience, the discussion in this section refers only to carbon stock changes but projects will have to account for both the carbon stock changes and emissions from non-CO_2 gases.

[130] A project developer may choose to not account for a specific carbon pool or gas for a given activity/area in both the baseline and with the project if he/she can prove that not including it will result in a conservative estimate of project benefits. The onus would be on the project developer to provide this proof through reference to scientific studies, opinion of well-established experts, measurements or other means.

[131] Lands that have been designated for as having ARD or forest management activities remain in Canada's national GHG inventory in perpetuity. Any future reductions in the carbon stocks on these lands must be compensated by emission reductions from other sources or purchases of Kyoto units. For this reason, forest sink projects will be subject to a permanence provision (see section 4 C).

[132] A project-based system does not preclude the aggregation of individual activities or land areas into one project for the purposes of registration. For example, a group of woodlot owners may find that there are advantages (such as cost savings or risk management) to aggregating their land areas under one project.

2 Baseline Determination for Forest Sinks Projects

[133] The *Climate Change Plan for Canada* (Plan) proposes that forest carbon stock changes resulting from BAU actions will be used to reduce Canada's overall emissions limitation commitment. It also specifies that forest project offsets would be based on beyond BAU practices or investments. The challenge presented by forest projects is to establish rules for baselines such that, to the extent possible, the changes in carbon stocks resulting from business-as-usual (BAU) actions are captured in the baseline, a requirement for all offset projects.

[134] As noted earlier, the general approach in the offset system is that project baselines should be a scenario that reasonably represents the GHG emissions by sources and removals by sinks that would occur in the absence of the project

activity. This is also a reasonable definition of BAU.

[135] National accounting for forest sinks and sources will include the sum of all carbon stock changes, resulting from both BAU actions and project actions. To minimize the potential for issuing offset credits for BAU carbon stock changes, and to ensure consistency of estimation and reporting, there must be a link between project level and national level accounting. If the parameters and models used to calculate forest project baselines are the same as those used in the national accounting system, consistency will be enhanced.

3 Option 1: "Without Project" Baselines

[136] Consistent with Section 4, this option defines the "without project" baseline as the scenario that reasonably represents the carbon stock changes on the project area that would occur in the absence of the project activity. These carbon stock changes would reflect the effects of land use practices in the absence of the project. This approach is also consistent with the desire to issue forest offset credits only for beyond BAU practices.

[137] The Netherlands is adopting a baseline that reflects carbon stock changes without the project activity for forest projects. This approach is also being recommended by a number of other countries for use with afforestation and reforestation projects in the Clean Development Mechanism (CDM). While the information requirements may differ, this approach can be used to determine baselines for any type of eligible forest project.

[138] General methodologies for determining the carbon stock change in the absence of the project activity are described in Section 4 A. With historic benchmarks the assumption is that future carbon stock changes without the project will maintain past trends. For forest projects the control group method would involve control plots outside the project area, chosen carefully to represent the ecological and management conditions of the project area. The control plots would be monitored over time and would reflect actual weather conditions and other local developments. The development of forward-looking projections would require assumptions about what practices would occur on the project area in the absence of the project. These assumptions could be based on examination of regulations, standards or typical industry activity in the area.

[139] Any of the above methods could be used to determine the "without project" baseline but differences in project types and conditions will mean that some methods are more appropriate than others for a particular project. The onus would be on the project developer to support the choice of baseline methodology by demonstrating that it adequately represents the impacts of the management practices that would occur without the project. Regardless of the methodology adopted, the resulting baseline may reflect increasing, constant, or declining carbon stocks over time.

[140] A baseline using regulatory requirements could represent the "minimum" because land must be managed according to regulation – this may be an appropriate baseline approach in some cases. However, using a baseline based on regulation may encounter two problems. The first is that regulations, guidelines and recommended practices may not adequately describe normal practices. For example, in many provinces there are few regulations governing forest management requirements on private land. As well, use of regulations could also be difficult given that, in most regions of Canada, a complex web of regulations, policies and guidelines influence, directly or indirectly, forest management practices. Determining which legal requirements, management guidelines and recommended standards of practice should be reflected in the baseline would be very difficult in some cases.

[141] In some cases the use of a "without project" baseline could provide an incentive for land managers to stop maintaining carbon sinks prior to the start of the offset system to minimize their future baseline. For example, a forestland owner that has been operating with above-regulation practices could change his/her practices to 'only what is required by regulation' from now until January 2008. Then a project that simply implements the past practice (i.e. previously BAU) could generate credits if recent historic benchmarks are used to set the baseline. To counteract this possibility, and in keeping with the principle of providing appropriate economic signals, the date from which 'without project' baselines are assessed could be set in the past, or the use of historic benchmarks could be restricted where there are indications of changes in management practices after 2000.

[142] Establishing what would occur in the absence of project activity may be relatively difficult and contentious in some cases. Expert review teams might need to do more work to establish the credibility of a proposed baseline, and conversely, greater onus could be placed on project proponents to establish the validity of their proposed baseline. This could be a disincentive to undertaking projects. Also, because of the sensitivity of carbon stock changes to site conditions, there likely would be less ability to standardize baselines.

4 Option 2: "Base Period" Baselines

[143] The general approach to offset project baselines described in Section 4 A is to not prescribe baseline methods, in keeping with the principle of open offset system design. However, in some circumstances it could be desirable to establish a single approach to forest project baselines to reduce costs. One such possibility is the use of base period baselines. In this approach, the baseline is assessed as the carbon stock change measured in (or representative of) the project area during a base period. This base period would be specified in the offset system rules and could, for example, be 1990-95 or the 10-year period prior to project inception.

The lower limit of the period is January 1st, 1990 due to the Kyoto Protocol rules, but there does not need to be an upper limit. A longer assessment period may be easier to estimate and have less variability. In this approach the baseline is fixed, based on actual measurements, before the project begins and does not change with future conditions.

[144] This option is similar to using an historic benchmark under Option 1, except that the period for establishing the benchmark is defined by the rules and is the same for all forest projects.

[145] The main advantage of this option is that a common 'base-period' for all forest sink projects reduces the complexity, and should result in lower costs and less onerous review procedures. However, this assumes that a 'base-period' can be defined for which carbon stock estimates are available for both the beginning and end of the specified period for all project sites.

[146] The main disadvantage of this option is that the carbon stock changes during the base period do not necessarily reflect what might happen in the future on the area in the absence of the project. This means that offset credits could be issued for BAU carbon stock changes and conversely credits may not be issued for some carbon stock changes that result from the project.

[147] For afforestation or reforestation projects, base period estimates may sometimes be relatively good representations of future carbon stock changes on the land in the absence of the project. This would be the case, for example, on land that has been pasture for many years, and would remain so without the project. A disadvantage of this option is that it does not work for projects to reduce deforestation or for forest management projects that avoid expected emissions because the baseline for such projects should be based on an assumed carbon stock loss in the future, not in the past.

5 Other Baseline Options

[148] In the development of the above options for forest project baselines a number of other options were also assessed for their applicability to a range of potential project activities, their reliability, and their ease of use. These options are similar to the "base-period" options in that they each create a single method to be applied for all forest sinks projects. Thus although they are all conceptually simple they reduce the flexibility of forest project developers to choose a baseline method most appropriate to their project. They also pose other problems and so were considered to be unsuitable for forest sink projects.

[149] For example, use of economic criteria is a potential option for setting a baseline. All activities that yield a financial return in excess of a specified threshold would be considered to be part of the baseline. This would require financial analyses to

establish the baseline. The ease of manipulation of financial data and assumptions (projected costs, revenues and discount rates) and the highly uncertain link between the investment and the resulting carbon stock changes limit the credibility of this approach. Investments in incremental forest management and afforestation/reforestation activities are often uneconomical in most regions of Canada, primarily due to the long period between the initial investment and the return (e.g. from planting to the sale of mature timber).

[150] The baseline for a project could also be defined to be a specified pre-determined percentage of the actual carbon stock change within the project boundary over a given period. The main difficulty with this approach is determining and justifying an appropriate percentage, which could have to be defined on a national or regional basis. This approach also has the potential to place an undue burden on individual projects, as the baseline percentage would have to be determined before a project begins and would be based on uncertain estimates and projections of carbon sources and sinks. The percentage might have no clear relationship to the actual impacts of the project.

6 Forest Management Cap

[151] The Marrakech Accords limit the contribution of forest management to Canada's target for the first commitment period. The actual forest management carbon stock change during the commitment period will only be known after 2012. This stock change will reflect both business-as-usual carbon stock changes and the impacts of forest management projects. The total could exceed the limit that Canada can account for, or in a worst case scenario, could be negative (a net source). Buyers and sellers of offset credits from forest management projects will want assurance that the credits will remain valid irrespective of what actual total forest management carbon stock change is reported in the national accounting.

7 Forest Sink Project Potential

[152] Many new forest sinks projects will not sequester large amounts of carbon for many years or even decades after they begin, with some exceptions such as fast-growing plantations that are able to sequester greater amounts of carbon in a shortened timeframe. Since most costs for project development and implementation are up-front, the magnitude of credits awarded in the first commitment period for some forest projects may not provide the minimum incentive needed for project developers. Market instruments such as futures contracts would help to alleviate this problem. In addition, other benefits may provide additional incentive. This issue does not arise with avoided emission forest projects as these projects can avoid substantial emissions in a short period of time and up-front costs are not an issue because credits are more immediate.

[153] Projects that prevent large emissions due to deforestation, harvesting and natural

disturbances likely have high potential in the first commitment period. For removals projects a key consideration is that sequestration rises over time as trees grow and/or carbon accumulates in response to actions like tree planting or changes in forest management practices. Thus the sequestration potential of forest carbon removal projects increases over a longer time frame but there is also greater uncertainty for project developers because carbon prices are increasingly uncertain over the long run. Offset system rules also have some uncertainty beyond the first commitment period. Less than 10 years remain until 2012 so the greatest potential from forest sequestration projects in the first commitment period is from planting fast-growing species - the earlier that planting occurs the greater the sequestration will be in the first commitment period. Slower growing species have greater potential in the long run but face greater financial barriers because most costs are up-front while benefits are slow to accrue.

How much potential is there for new forest sinks projects? What considerations in offset system design would help overcome the fact that much of the benefit of some forest projects may not occur for a long time?

8 Summary

[154] The *Climate Change Plan for Canada* (Plan) proposed that BAU sinks will be used to reduce the overall emission reduction burden and that only enhancement of BAU sinks due to new investment will be eligible for offset credits. A baseline approach that allows crediting of BAU sinks would increase the burden on other sectors.

[155] The "without project" baseline approach - Option 1 - is consistent with the approach proposed in the Plan and can be applied to all project types. While the transaction costs may be higher than some other options for both project proponents and offset system review teams, it is more credible than other approaches. The costs should decline over time as the initial project of each project type is registered and its quantification protocol is available for use by similar project activities under similar conditions (site, region, etc.).

[156] The "base period" option could also be suitable but could not be used for project activities designed to avoid emissions (e.g. reduced deforestation, fire / insect / disease prevention). Another approach would have to be used for these projects if they are eligible under the offset system.

Do you agree that Option 1 – "Without Project" Baseline – is the preferred option for forest projects?

What methodologies do you think are most appropriate for forest projects, and would be most used under the "without project" baseline approach? Why?

How should changes in regulations be reflected in project baselines under this

option, if at all?

Would you prefer Option 2 - Base Period Baseline? If so, what do you think is an appropriate base period for which carbon stock change data are likely to be available?

B. Agriculture

1 Introduction

[157] In 1996, the Canadian agriculture sector contributed approximately 10% of Canada's total anthropogenic emissions. Within agriculture, nitrous oxide (N_2O) accounts for 61%, methane (CH_4) accounts for 36%, and carbon dioxide (CO_2) 3% of total emissions. The agriculture sector will be able to generate offset credits through both emission reduction and removal projects. Projects to enhance sinks on agricultural land will also be eligible if Canada elects to include cropland and grazing land management in its national accounting.[9] The decision on whether to include cropland and grazing land management must be made by the end of 2006.

[158] The remainder of this section focuses on offsets from sinks enhancement because of the interest in such projects and because they raise more complex issues than emissions reduction projects. This focus should not be taken as reflecting the relative importance of agricultural emission reduction projects in the offsets system. Indeed, over the longer term, emission reduction projects are expected to play a more important role than removals, because sinks have finite capacity, emission reductions are permanent, N_2O and CH_4 account for most of the emissions and have higher global warming potentials than CO_2, and more economic emission reduction technologies for livestock CH_4 emissions and for fertilizer application N_2O emissions are expected to be developed.

[159] Agricultural sink enhancement projects increase the carbon stored in the soil. Many factors affect the soil carbon stocks, including vegetative cover, weather conditions, and human land use activities. Since the beginning of the industrial revolution, land use changes, such as the conversion of temperate forests and prairie grasslands to agricultural fields, have significantly reduced the carbon content of agricultural soils. Traditional management techniques, such as intensive cultivation and use of summerfallow, increased the rate of soil carbon loss.

[160] There is a limit to the total amount of organic carbon that a soil can store. The

[9] While revegetation could also be included, this seems unlikely as most land management activities could be captured under the definitions of forest, cropland or grazing land management.

limit will vary among land management systems, and depends on the rate at which organic carbon is added to and lost from the soil system. The annual increase in soil carbon declines over about 20 years as the soil carbon rises (i.e. annual carbon sequestration decreases asymptotically as the soil approaches the saturation limit). Current estimates for the annual soil carbon increase on the prairies under zero till cropping are between 0.54 to 1.34 tonnes CO_2/ha/year depending on the soil zone. The cropping practices must be sustained to achieve the potential sequestration and to prevent release of the carbon that has been stored. Depletion of soil carbon (as CO_2 emissions) commences if the farmer switches back to conventional tillage and summerfallowing.

[161] Measuring changes in soil carbon accurately at the scale of a farm can be relatively expensive. The costs could be reduced by estimating changes over much larger areas. These considerations, along with a number of issues associated with baseline protocols, incentives and limited sink capacities, transaction costs and risks, and expected participation rates, lead to two approaches that the agriculture sector may take to generate removal (sinks) offset credits. While the approaches are presented in the context of removal offsets, the approaches may also be considered in terms of emission reduction offsets. Each approach has advantages and disadvantages and may be better suited for certain mitigation practices and for certain sub-sectors.

2 Independent Projects Approach

[162] Under this approach producers independently develop projects to generate offsets. This approach would not restrict who could participate or the type of agricultural practice used to generate the offset, so long as the project meets the eligibility criteria. Since there are over 240,000 farms in Canada, the number of potential projects is very large. This could present an administrative challenge to the offset system. However, this approach would also not restrict how producers choose to enter into aggregation contracts with each other or with other offsets system participants, so long as each individual project meets the eligibility criterion.

[163] Independent projects would involve the area affected by the beneficial management practices (BMPs) such as reduced tillage, less summerfallow, and increased use of forage. However, even if the BMPs are applied to only a portion of the farm, the project boundary could include the whole farm in order to ensure all the impacts of the project under the control of the project proponent are included in the accounting. Changes in farm structure during the course of a project would have to be reported to the offset body but changes in the project status would only occur if the changes in farm structure materially affected the project.

[164] Projects will only be awarded offset credits for net increases in sinks that occur

during 2008-2012 crediting period. The baseline for an independent project would be established by documenting the annual emissions and carbon stock levels for the project at the start of the project and projecting BAU changes to emissions and carbon stocks over the 2008-2012 crediting period. Actual emissions would need to be determined each year and carbon stocks would need to be determined at the end of the crediting period to calculate the net reductions/removals achieved.

[165] The net increase in carbon stocks for an individual project can be quantified through measurement or statistical estimates. Measurement techniques include direct field measurements, laboratory measurements of total carbon in the soil for an appropriate number of samples at the start and the end of the crediting period. Laboratory or field methods may pose significant costs for individual farms.

[166] Alternatively, statistical models or process models, such as those used in the national inventory process, could be applied to individual projects to estimate the impact of the BMPs on the carbon stocks. Quantification would involve a model-based estimate of the expected change in stock levels given a switch from the baseline technology or management practice to the BMPs adopted for the project for the duration of the crediting period. Statistical estimates would be less costly, but also less accurate than measurements and would require more information on historical management practices.

[167] The *Climate Change Plan for Canada* proposes that offsets be net of BAU reductions and removals of GHGs. Under the independent projects approach, the baseline could account for the BAU net increase in carbon stocks in one of the following ways:

- historical management practice on the farm would be used as the expected BAU scenario;
- assessment of the financially optimal agronomic practices for the project crediting period would be defined by a third party; or
- broadly-determined aggregate estimate of expected BAU would be applied equally to all similar offset projects.

[168] If the required information were available, historical management practice could provide a simple and inexpensive way to estimate BAU, but may not be a reasonable assumption of BAU actions for all farmers that implement independent projects. An independent assessment of the financially optimal agronomic practices for the farmer during 2008-2012 would require a number of assumptions and so may be contentious. It would also involve significant analytical costs. Alternatively, baselines for individual projects could be based on an aggregate forecast of BAU carbon stock changes, which would then be apportioned equally to individual project baselines (the initial carbon stocks of a project could be part of the baseline, or the entire project baseline could be based on the aggregate information). This regional average approach could provide

certainty to the project proponents but may transfer the risk of an inaccurate baseline to the rest of the economy. The regional average approach would be the lowest cost, as it would involve lower information requirements and transactions on the part of individual farmers.

[169] The quantification approaches summarized above, in conjunction with the BAU estimations, raise some potential issues for the workability of the independent projects approach.

[170] (1) The use of statistical estimates to determine the change in carbon stocks and using historical management practice as the BAU both require information on the management practices used prior to the start date. It may not be possible to verify those practices.

[171] (2) Individually determined baselines may not provide appropraite economic signals, as they may create an incentive to delay early adoption of BMPs, or to reverse existing BMPs, to reduce the starting carbon stocks for the project area. Delayed adoption of BMPs is more likely than reversals, since there are other agronomic and economic reasons for maintaining an already adopted BMP.

[172] (3) Individually determined baselines may also provide different benefits to early developers and late adopters of BMPs as the early developers would not have the same opportunities as late adopters to benefit from the offset system.

[173] The large number of potential projects could create administrative problems for the offset system. The administrative burden could be reduced somewhat by aggregating similar projects.

How should changes in carbon stocks be determined for individual projects? If measurement is required what techniques should be used? What are the conditions (e.g., minimum area) under which statistical estimates are appropriate?

How should the baseline account for the BAU increase in the net carbon stock?

How should boundaries be specified for individual agricultural offset projects?

3 Pooling Approach

[174] The pooling approach would provide an opportunity for producers wishing to participate in the offsets system to join a formal entity representing an 'offsets pool'. The pool would be an organized group of producers who adhere to a specified set of BMPs to produce offset credits in aggregate. A BAU baseline would be estimated for the entire area covered by the pool using regional scale modeling. Members would document that the BMPs are being implemented/used

for the specified areas. Quantification of the net emission reductions and carbon removals achieved would cover the entire area in the pool, and would take into account leakage outside of the pool boundary. Offset credits would be issued to the pool.[10]

[175] The offset credits received would be sold by the pool. Payments to pool members would be based on a formula reflecting the degree to which the BMPs were adhered to over space and time. That is, payments would be based on the area and time period for which each practice was employed, as opposed to the net carbon stock increase on an individual producer's farm. It would also be possible for the formula to reflect certain local factors, such as regional biophysical features. The pool would also have membership exit and re-entry rules that could entail certain financial penalties or restrictions.

[176] Pool members would designate the land areas covered by each set of BMPs. The sum of those areas would define the project. Pool members would be required to provide documentation to the pool administrator demonstrating implementation/use of the BMPs on the designated lands each year of the 2008-2012 crediting period. The offsets system verification process would rely on information supplied by the pool, as opposed to information from individual pool members.

[177] Carbon stock levels at the beginning and end of the 2008-2012 period could be derived from approved measurement methodologies or from statistical or process models. There are many practical advantages to using quantification approaches and information used in the national inventory process and from NCGAVS modified according to pool boundaries. NCGAVS (National Carbon and Greenhouse Gas Emission Accounting and Verification System for agriculture) will be in place by March 2005 and will provide the means for synthesizing information from multiple government and university data collection and GHG research activities to make regional, provincial, or national assessments of the amount and uncertainty of GHG agriculture sources and sinks. The NCGAVS project will also develop methodologies for monitoring actual soil carbon change and nitrous oxide emissions to corroborate and improve the GHG source/sink accounts.

[178] The baseline BAU changes in carbon stocks for the pool area are generally not measurable but could be estimated using statistical or process models based on projected farming practices for 2008-2012. This projection of expected farming practices is the scenario of what would have happened without the offsets system incentives. This is consistent with criteria for the offset system and baseline

[10] A "project" is any organized efforts to generate offset credits within the offsets system. As such, the pool may be considered a single project that includes many producers. A pool differs from an aggregation of individual projects in terms of how the baseline(s) is established, how the sink increase(s) is determined, the information participants report, and how the credits or payments to participants are determined.

determination.

[179] The benefits of the pooling approach vary according to the type of GHG reduction or removal, and their associated BMPs, due to varying biophysical, technical and economic characteristics. Assessments can be made on which practices would benefit from a pooling approach. The pooling approach has the potential to:

- provide appropriate economic signals by removing disincentives to the early adoption of BMPs and to the maintenance of existing and future BMPs, since pool membership and payment is based on practice, not on individual offset tonnes generated
- eliminate the need for farm-specific information on historic management practices
- reduce the costs of calculating the net emission removals by eliminating the need for farm-specific measurement of soil carbon stocks
- reduce the volume of transactions and associated costs anticipated under an independent projects approach
- provide higher participation rates over space and time due to improved equity between early and late adopters
- provide low-cost farmer-based extension information and representation on the production and marketing of offset credits
- provide more financial and risk management options to farmers considering participation in an offset system
- start a record of implementation of BMPs.

[180] The main potential drawback of the pooling approach is that certain farmers who have low carbon stocks and high sequestration potential may be able to achieve higher gross revenue from offsets credits under the independent projects approach. However, higher costs and risks would also be expected for those independent projects than would be expected for farmers participating in the pooling approach.

[181] The pooling approach could involve private or public administration of the pool. The Canadian agriculture sector has a lot of experience with both private and public forms of cooperative organizations and can draw on this experience in formulating options for the administration of a pool. A key requirement for the administration of a pool is that it be separate and distinct from the offset system regulatory bodies. A pool would face the same independent and transparent review process as any other offsets project. In either case, private or public administration, it is expected that the expenses for the development and review of the pool's offsets will be paid for by the pool and its members, possibly with some government assistance for development of protocols and initial reviews. Pool revenue will come only from the offsets market.

[182] The pooling approach could also involve more than one pool. Pools may be

regionally based or be based on a specific BMP or set of BMPs. However, a number of the advantages listed above for the pooling approach would be lost with smaller groups. For example, risks and transaction costs would be higher in smaller pools.

Under the pooling approach, what form of public or private administration of the pool would work best?

Under the pooling approach, what membership criteria should a pool have?

Which approach for participation in the offset system do you think is preferable, and why? Should both approaches be available?

C. Landfill Gas

1 Emission Reductions from Landfills

[183] Landfill gas (LFG) is produced by anaerobic decomposition of organic waste accumulated in landfill sites. Although its composition varies over time and from site to site, landfill gas is generally considered to contain 50% methane (CH_4) and 50% carbon dioxide (CO_2), mixed with rare gases. Production of landfill gas continues for more than 50 years after burial of the waste.

[184] GHG emissions from landfill sites can be reduced by the capture and combustion of the landfill gas. The CH_4 collected is converted to CO_2 by combustion, thus reducing its Global Warming Potential (GWP) from 21 to 1. To be consistent with the national inventory accounting, a reduction of 21 tonnes of CO_2e is awarded for every tonne of CH_4 combusted. The CO_2 from landfills and LFG combustion comes from organic matter, which sequestered carbon from the atmosphere as part of its biological growth. These CO_2 emissions, therefore, are not included in a country's emissions inventory.

[185] Instead of being flared, CH_4 captured from landfills can be used to generate electricity or as a substitute for natural gas or other fuels. Such uses can reduce emissions by displacing coal, oil, or natural gas that would otherwise have been used. Uses of landfill gas that directly replace other fossil fuels, whether onsite or offsite (an example of an offsite use would be the sale of landfill gas to a greenhouse for heating) could be accounted for within the project boundary. However, the ownership of offsite reductions would need to be resolved. Since the electricity sector is covered by the LIE backstop/covenant system, it is not expected that offset credits could be created from the utilization of LFG to produce power that is sold into the electricity system or displaces purchase electricity.

[186] Apart from capture and combustion, other practices for reducing GHG emissions

from landfills also exist and may be eligible for the generation of offset credits under an open system.

[187] Currently, only Ontario has a LFG regulation in place, while Quebec has a proposed regulation and British Columbia has a guideline. Emissions may also be controlled by operating permits. In 2001, 41 landfills captured and combusted about 25% of the landfill methane emitted annually in Canada corresponding to emissions of 7.2 Mt CO_2e. Offset credits cannot be earned from the BAU reductions of these existing projects. The additional emission reduction potential is estimated at 8 -10 Mt CO_2e from approximately 100 landfills. Additional information on existing regulation and the status of LFG management can be obtained at www.climatechange.gc.ca.

2 Policy Treatment of Landfill Gas

[188] In contrast to most other categories of sources and sinks, the *Climate Change Plan for Canada* does not define a policy or target reduction for landfills as a contribution toward meeting Canada's Kyoto commitment. Rather, the Plan proposes to *"consult on whether to regulate emissions reductions from new capture and flaring of landfill gas or allow them to be sold as offsets"*.

[189] To address the consultation requirements set out in the Plan, the two options described and assessed below are (1) expanded regulation as the principal mechanism to achieve new LFG capture and combustion, and (2) reliance on the offset system as the principal mechanism to encourage new LFG capture and combustion. The implications for each option in terms of feasibility, incentives and contribution to Canada's Kyoto target are also reviewed.

[190] Both options allow the creation of offsets only for emission reductions beyond required reductions (from regulations/operating permits) and beyond reductions resulting from other climate change measures consistent with the criteria of an offset system. This ensures that credits would not be awarded for the 7.2 Mt CO_2e of BAU emissions reductions which occurred in 2001 and which are expected to increase marginally over the commitment period. This also ensures that credits would not be awarded for the 2.2 Mt CO_2e of emission reductions resulting from Green Municipal Funds.

3 Option 1 - Expanded Regulation

[191] Expanded regulation of LFG emissions by the provinces or the federal government would result in capture and flaring of a much larger share of the total methane emissions. Regulated reductions would contribute towards achieving Canada's Kyoto commitment.

[192] As demonstrated at various landfills in Canada, regulatory requirements do not

provide an incentive to achieve the highest feasible rate of LFG capture at a given landfill site. Landfills would be eligible to generate offset credits for emission reductions beyond BAU and beyond those required by regulations/operating permits or resulting from other government climate change measures.

[193] Regulations require that a collection and combustion activity take place, but generally do not specify a required rate of LFG capture. To create offsets beyond required reductions, the quantity of reductions required by the regulations would have to be determined. Rules would have to be developed jointly by the provincial, territorial and federal governments. It is likely that these rules would vary by province and territory. The actual quantification of regulated emissions would have to be carried out on a site-specific basis.

[194] The existing regulation in Ontario is directed at large new and expanding landfills and does not address existing or closed landfills. However, most of the GHG emissions and emission reduction opportunities occur at existing or closed landfills. Expanded regulations focusing only on new and expanding landfills, would have little impact on Canada's LFG emissions during the first commitment period.

[195] If the expanded regulations prescribed collection and combustion of LFG at existing and closed landfills, they could yield additional benefits, such as reduced odour and risk of explosions, for adjacent communities. These secondary benefits might not be achieved in the absence of regulations.

[196] Landfills are currently regulated by the provinces and territories. Expansion of regulations by provinces and territories would very likely be a complex and lengthy process. Expanded regulations would have to be designed to incorporate attributes that vary across landfills, such as size and remaining life. In addition, it is unlikely that every province and territory would regulate, and where regulations are established, it can be expected that they would vary among the provinces and territories. Thus similar landfills in different provinces and territories would have different potential to generate offset credits for reductions in excess of their regulated requirements. However, expansion of regulations by provinces and territories would provide for a greater role for province and territories in national climate change action.

[197] Expanded regulations will raise costs for landfill owners/operators and these cost increases will likely be reflected in increased tipping fees and taxes. Regulations are also likely to be a relatively less economically efficient approach to GHG emissions reduction, resulting in differences in the cost per tonne of CO_2e reduced at different landfills.

4 Option 2 - Inclusion of LFG in an Offset System

[198] In this option the principal incentive for new capture and combustion of CH_4 from landfills would be the ability to earn offset credits. This option would neither require nor preclude new provincial regulation of LFG emissions. That is, provincial and territorial governments would be free to require installation of capture and combustion systems at landfills to address odour, safety and other concerns through operating permits and/or regulations. As with Option 1 discussed above, offset credits could only be generated for reductions beyond BAU and beyond those required by regulation/operating permits and resulting from other government climate change measures. The design of the offset system will need to ensure that it provides appropriate economic signals, and does not create an disincentive for provincial/local LFG regulations where these are needed to address odour, safety or other concerns.

[199] This option would be relatively easy to implement as it does not require the establishment of new regulations for the capture and combustion of LFG.

[200] This option offers the highest returns for installing capture and combustion systems at landfills where the cost per tonne of CO_2e reduced is lowest and rewards efforts to achieve the highest feasible capture rate. Thus, an incentive for collection and combustion of the maximum amount of LFG is provided. Capture and combustion systems would be installed only at landfills where the cost is expected to be recovered from the sale of offset credits, so this option would not raise tipping fees or taxes.

[201] Sites with large supplies of low cost methane that could install electricity generation or find other uses for the methane could generate additional indirect emission reductions and earn additional revenue. There is a high potential that this option could stimulate increased LFG utilization and renewable energy development.

5 Contribution to Achieving Canada's Kyoto Target

[202] From any project earning offset credits, under either option presented above, a contribution towards achieving Canada's Kyoto target will be required. The contribution could be defined as a percentage of eligible reductions. Eligible reductions are reductions beyond BAU and those required from regulations/operating permits or resulting from other government climate change measures. The size of the contribution would be specified in the rules of the offset system.

[203] Some factors that could be considered in implementing the contribution include:

- old regulations/operating permits vs. new regulations/operating permits (including changing regulations/operating permits)

- small sites vs. large sites
- new sites vs. existing (closed/open) sites
- administrative complexity
- equity issues within the sector (and across provinces) and with other sectors, including whether the contribution is inclusive of or incremental to reductions required from regulations/operating permits and/or reductions resulting from other climate change measures
- other factors that might be a barrier to entry

What do you think of the concepts of Option 1 and Option 2? What is your preference and why?

Based on your preference, what do you think are the most important factors for implementation?

What contribution - expressed as a percent of eligible reductions at a site - do you think would be reasonable?

D. Other Sectors

1 Reduction/removal projects in other sectors

[204] An open offset system is intended to encourage innovation and the development of a wide range of offset projects in sectors across the economy that are not covered by the backstop/covenant system. As will be noted below, LIE participants may generate offsets from activities that are outside the LIE system.

[205] Offset projects in other sectors must be surplus, that is, the reduction/removal, or the activity that causes it, exceeds the level that might reasonably be expected will be achieved due to another climate change measure, and is not required by an existing federal/provincial/local regulation or operating certificate.

[206] Projects in other sectors are only eligible to create offset credits if they result in reduction/removals at sources/sinks that are not captured by the LIE backstop/covenant system. Consequently it is not expected that projects that supply electricity from non-emitting sources and projects that reduce purchased electricity would be eligible to create offset credits.

[207] Examples of possible offset projects/activities include the following:

- projects by LIEs in parts of their operations not covered by the backstop/covenant system (e.g., projects by large integrated forest sector companies who reduce emissions in their lumber or panel mills);
- fugitive methane emission reductions in the upstream natural gas sector (e.g.,

projects to reduce venting and pipeline leaks); and
- transportation sector projects (e.g., vehicle fleet fuel conversions).

2 Baselines

[208] In general, there will likely be few standard quantification protocols available for these sectors, and project proponents will be responsible for developing, justifying and fully documenting baseline assumptions and methods. Proponents will need to consider a range of factors in constructing a reasonable scenario of emissions/removals in the absence of the project, including:
- external factors, such as the economic situation in the project sector and factors affecting market conditions, as well as legislation and government programs affecting the project sector;
- on-site factors, including activity levels, process and technology choices, and fuel choices; and
- risks to key factors affecting emission reduction/removal levels.

Project proponents may need to demonstrate that a conservative approach has been taken where there is uncertainty about outcomes, and that emission reductions/removals are at the lower end of the estimated range.

[209] Where standard protocols are not available, proponents will need to consider which of the baseline approaches (discussed in 4 A) are most applicable:
- historical/current situation
- comparison approach
- control group
- forward–looking scenarios
- regional average.

[210] In all cases, proponents will need to demonstrate that they have chosen a baseline approach that provides the most reasonable representation of reductions/removals that would likely occur in the absence of the project.

3 Contribution

[211] All sectors will be required to make a contribution towards achieving Canada's Kyoto target. In the case of the sectors under discussion in this section, the contribution could be achieved through an adjustment to the baseline, requiring a percentage of the eligible reductions generated by the activity be retired or through other approaches.

6 NEXT STEPS AND FURTHER INFORMATION

A. Next Steps

[212] An *Offset System Design Paper* is planned for release in the fall of 2003. The *Design Paper* will be a development of the *Discussion Paper*, and will take into consideration the feedback obtained from provinces/territories and stakeholders during June 2003 consultations. The *Design Paper* will put forward a full offset system design and administration proposal. Provinces/territories and stakeholders will be invited to submit written comments on the proposed design package. These comments will be considered before a recommended approach to the offset system design and administration is finalized.

[213] Comments on the *Discussion Paper* should be sent to:

Offset System Discussion Paper
Climate Change Economics Branch
Environment Canada
10 Wellington Street, 24th floor
Gatineau, Quebec K1A 0H3

consultations2003@ec.gc.ca

B. Further Information

[214] For more information consult the following websites.

- Offset Consultations Information
  - Government of Canada Cllimate Change (http://www.climatechange.gc.ca)

- Government of Canada Departments
  - Agriculture and Agri-Food Canada (http://www.agr.gc.ca/policy/environment/eb/public_html/ebe/climate.html)
  - Environment Canada (http://www.ec.gc.ca/envhome.html)
  - Natural Resources Canada (http://www.nrcan-rncan.gc.ca/inter/index.html)
  - Natural Resources Canada, Canadian Forest Service (http://www.nrcan.gc.ca/cfs-scf/)
  - Department of Foreign and International Affairs, Clean Development Mechanism/Joint Implementation Office (http://www.dfait-maeci.gc.ca/cdm-ji/menu-en.asp)

- Domestic Policy
  - Government of Canada Climate Change web site (http://www.climatechange.gc.ca/)
  - National Climate Change Process (http://www.nccp.ca/)

- Domestic Pilots
  - Greenhouse Gas Emission Reduction Trading (http://www.gert.org/)
  - Clean Air Canada Inc. (http://www.cleanaircanada.com/)
  - Pilot Emission Removals, Reductions and Learnings Initiative (http://www.ec.gc.ca/perrl/home_e.html)

- International Policy
  - Kyoto Protocol (http://unfccc.int/)
  - Marrakech Accords (http://unfccc.int/resource/docs/cop7/13.pdf)

ANNEX 1

ACRONYMS AND GLOSSARY

Acronyms and Abbreviations

ARD -afforestation, reforestation and deforestation
BAU - business-as-usual
BMPs - beneficial management practices
CDM - Clean Development Mechanism
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
ERUs - Emission Reduction Units
GERT – Greenhouse Gas Emission Reduction Trading Pilot
GHG - greenhouse gas
JI – Joint Implementation
LFG – landfill gas
LIE - large industrial emitters
Mt - megatonne
N_20 - nitrous oxide
NCGAVS - National Carbon and Greenhouse Gas Emission Accounting and Verification System for Agriculture
PERRL – Pilot Emission Removals, Reductions and Learnings Initiative
PERT – Pilot Emissions Reduction Trading Project

Glossary

Annex 1 Parties – Countries listed in Annex 1 to the United Nations Framework Convention on Climate Change that have ratified the Convention. These are mainly industrialized countries. Proposed emission limitation commitments for Annex 1 Parties to the Convention are specified in Annex B to the Kyoto Protocol. The commitments do not take effect unless the country ratifies the Kyoto Protocol and the Protocol enters into force (See www.climatechange.gc.ca for more information on the Kyoto Protocol.)

Afforestation – Under the Kyoto Protocol, the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources.

Assigned Amount Units (AAUs) – Under the Kyoto Protocol, each industrialized nation is allocated an "assigned amount" of GHG emissions for the 2008-2012 commitment period equal to its emissions limitation commitment. The total assigned amount is divided into units of 1 metric tonne of CO_2 equivalent. See Kyoto Compliance Units.

Avoided Emissions – Avoided emissions are reductions/removals that result from projects or activities that prevent emissions that would otherwise have occurred, particularly from new sources. Examples of projects or activities that avoid emissions include:

- activities to prevent deforestation, or prevent forest fires or disease, and
- construction of a state-of-the-art energy efficient building instead of current standard practice.

Backstop/Covenant System - The Plan proposes that targets for emissions reductions -- totalling 55 Mt CO_2e -- be established for large industrial emitters through a backstop/covenant system. The covenant would be an agreement regarding emission reductions between a large industrial emitter and the federal government. The backstop will provide a "default" target for industry and cover such issues as compliance, reporting and verification. Companies will be given the option of remaining under the provisions of the backstop or entering into a covenant with the federal government. A large industrial emitter could meet its target under the backstop or a covenant in several ways – reduce its own emissions, purchase the emission reductions of other large industrial emitters in the form of domestic permits, purchase Kyoto compliance units, and/or purchase offset credits.

Baseline – The baseline for a project is the scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases or removals by sinks that would occur in the absence of the proposed project. A baseline shall cover emissions from all gases, sectors and source categories listed in Annex A of the Kyoto Protocol and removals by all ecosystem carbon pools within the project boundary.

- Project-Specific Baseline: Developed for a new project/project type.

- Standard Baseline: The baseline for a registered project will be used as a precedent for other projects of the same type. If adjustments are required to the standard baseline to meet the circumstances of the project, these adjustments must be justified.

Baseline Lifetime – The time period over which a baseline remains valid.

Boundary – The project boundary encompasses all anthropogenic emissions by sources and removals by sinks of greenhouse gases under the control of the project proponents that are significant and reasonably attributable to the project activity.

Business as Usual (BAU) – The activities, emissions or removals that would occur in the absence of the proposed offset project.

Carbon Pool – Reservoir or system which has the capacity to accumulate or release carbon, including the atmosphere. Under the Kyoto Protocol the following pools must be accounted for: above-ground biomass, below-ground biomass, litter, dead wood, and soil organic carbon.

Carbon Sequestration– The process of increasing the carbon stored in a carbon pool other than the atmosphere.

Carbon Stock – The absolute quantity of carbon held within a pool at a specified time, expressed in units of mass.

Carbon Stock Change – The change in carbon stock over a specified period of time.

Certified Emission Reductions (CERs) – The credits issued for emission reductions or sink enhancements by a project under the Clean Development Mechanism (CDM). CERs can be used by an Annex I Party to help meet its commitment under the Kyoto Protocol. Each CER allows emissions of 1 metric tonne of CO_2 equivalent. See Kyoto Compliance Units.

Clean Development Mechanism (CDM) – A mechanism that allows emission reduction and afforestation/reforestation projects to be implemented in developing countries that have ratified the Kyoto Protocol. CDM projects earn Certified Emission Reductions for the emission reductions/removals achieved.

Commitment Period – A period for which the emissions limitation commitments apply under the Kyoto Protocol. The first commitment period is 2008 through 2012.

Compliance Units – Allowances, permits or credits that can be used for compliance with a domestic greenhouse gas emissions target as dictated by the federal government. Kyoto Compliance Units can be compliance units, but domestic allowances, permits and credits are not Kyoto Compliance Units.

Compliance Unit Registry – The registry where ownership of offset credits will be tracked. Each person or entity that owns offset credits will have an account in the registry, which lists the offset credits owned by that person or entity by serial number. A sale of an offset credit results in its transfer from the account of the seller to the account of the buyer. The Compliance Unit Registry could be the National Registry Canada is required to establish to track ownership of Kyoto Compliance Units held by Canadian persons and entities.

Conference of Parties – Meeting of the countries that have ratified the Framework Convention on Climate Change. Usually held once per year, the countries agree on actions to implement the provisions of the Convention.

Covered Emissions – The emissions by a large industrial emitter that are subject to its emission reduction requirement under the backstop/covenant system.

Crediting Period – The period for which an offset project may earn offset credits for emission reductions/removals achieved.

Cropland Management – Under the Kyoto Protocol it is the system of practices on land on which agricultural crops are grown and on land that is set aside or temporarily not being used for crop production. Canada must decide by late 2006 whether it wishes to include this activity in its Kyoto Protocol accounting in the first commitment period.

Deforestation - The direct human-induced conversion of forested land to non-forested land.

Emissions – Greenhouse gas emissions, as stipulated in the Kyoto Protocol: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6).

Emissions Reduction – A decrease in emissions released into the atmosphere by a source (e.g., capture and flaring of landfill gas reduces methane emissions).

Emission Reduction Units (ERUs) – The credits issued for emission reductions or sink enhancements by a project under Joint Implementation (JI) as defined in Article 6 of the Kyoto Protocol. ERUs can be used by an Annex I Party to help meet its commitment under the Kyoto Protocol. Each ERU allows emissions of 1 metric tonne of CO_2 equivalent. See Kyoto Compliance Units.

Emissions Removal - A removal of greenhouse gases from the atmosphere (i.e. by sequestration).

Forest – Under the Kyoto Protocol a forest is a minimum area of land of 1.0 hectare with tree crown cover (or equivalent stocking level) of more than 10-30 per cent with trees with the potential to reach a minimum height of 2-5 metres at maturity *in situ*. A forest may consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10-30 per cent or tree height of 2-5 metres are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention such as harvesting or natural causes but which are expected to revert to forest. Canada has yet to make a decision on the two parameters for which a range is specified. Project developers should assume that an area would only be considered forest if it has minimum crown cover of 30% and a minimum potential tree height of 5 metres.

Forest Management – Under the Kyoto Protocol it is a system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner. Canada must decide by late 2006 whether it wishes to include this activity in its Kyoto Protocol accounting in the first commitment period.

Forest Management Cap – The maximum amount of forest management Removal Units

under Article 3.4 of the Kyoto Protocol that can be added to the Assigned Amount Units assigned to a country, after using the forest management sink to offset any net source from afforestation, reforestation and deforestation. (See www.climatechange.gc.ca for a discussion of Canada's Forest Management Cap.)

Global Warming Potential – An index describing the radiative characteristics of well mixed greenhouse gases that represents the combined effect of the differing times these gases remain in the atmosphere and their relative effectiveness in absorbing outgoing infrared radiation. This index approximates the time-integrated warming effect of a unit mass of a given greenhouse gas in today's atmosphere relative to that of carbon dioxide. The Conference of the Parties has adopted the Global Warming Potential values. (For GWP values for the first commitment period, see www.climatechange.gc.ca.)

Grazing Land Management – Under the Kyoto Protocol, it is the system of practices on land used for livestock production aimed at manipulating the amount and type of vegetation and livestock produced. Canada must decide by late 2006 whether it wishes to include this activity in its Kyoto Protocol accounting in the first commitment period.

Greenhouse Gases – Greenhouse gases are constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation. Greenhouse gas emissions covered by the emissions limitation commitments of the Kyoto Protocol are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6).

International Emissions Trading (IET) – Trading of Assigned Amount Units under Article 17 of the Kyoto Protocol.

Joint Implementation (JI) – A mechanism that allows emission reduction and removal projects to be implemented in countries that have ratified the Kyoto Protocol. A JI project can only be located in an Annex I Party with an emissions limitation commitment under the Kyoto Protocol. JI projects earn ERUs for the emission reductions/removals achieved.

Kyoto Compliance Units – Units recognized under the Kyoto Protocol as compliance units for national emission limitation commitments: Assigned Amount Units (AAUs), Emission Reduction Units (ERUs) from the Joint Implementation Mechanism, Certified Emission Reductions (CERs) from the Clean Development Mechanism and Removal Units (RMUs).

Large Industrial Emitters – Entities in the thermal electricity, oil and gas, and manufacturing sectors. A partial list is provided in Annex 2.

Leakage – Leakage is an increase in emissions or reduction in removals outside a project's boundary (the boundary defined for the purposes of estimating the project's net GHG impact) resulting from the project's activities. Leakage is associated with changes

in reductions/removals that are significant and reasonably attributable to the project, but are not under the control of the proponent.

National Registry – The accounting system, which records national holdings of Kyoto compliance units (and national emissions) and through which Canada will demonstrate compliance with its Kyoto target.

National Inventory – The aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases for the gases and source categories covered by the Kyoto target during a specified year. (See www.climate change.gc.ca for a list of the sources covered by Canada's national inventory.)

Non-Permanence – A condition (or event) related to the temporary nature and reversibility of greenhouse gas removals by sinks.

Marrakech Accords -- Detailed rules for a number of the provisions of the Kyoto Protocol that were negotiated and adopted by Conference of the Parties 7 in Marrakech, November 2001.

Monitoring – Periodic measurement of greenhouse gas emissions/removals.

Offset Credits – An offset credit is a compliance unit for the backstop/covenant system. Offset credits are awarded for net emission reductions or removals achieved by a registered offset project during 2008-2012 as certified through the offset review process.

Offset Review Process – The process used to determine that a proposed project meet the eligibility criteria and principles laid out in the legislative framework establishing the offset system. A proposed project that meets all of the requirements is registered as an offset projects and is able to generate offset credits.

Offset Project Registry – The Offset Project Registry stores information related to individual offset projects:

- Project documents and studies
- Information on baselines and measurement
- Verification protocols and reports

The Offset Project Registry will be used to track the project review from application to issuance of offset credits. The offset credits in the Compliance Unit Registry are linked to the project information in the Offset Project Registry by their serial numbers or other means.

Offset System – The offset system awards offset credits for verified emissions reduction or removals by eligible projects during the 2008-2012 commitment period. Participation is voluntary.

Party – A country that has ratified a particular international agreement such as the United Nations Framework Convention on Climate Change or the Kyoto Protocol.

Project – An activity undertaken by a proponent to reduce or remove emissions.

Project Boundary – The boundary that encompasses all anthropogenic emissions by sources and removals by sinks of greenhouse gases under the control of the project proponents that are significant and reasonably attributable to the project activity.

Project Document – A document prepared by the proponents describing a proposed project in sufficient detail to enable an assessment as to whether it should be registered as an offset project. The project document must include a quantification protocol indicating how the net emission reductions or removals will be quantified.

Project Proponents – The active participants and investors in an offset project. The project proponents designate the owners of the resulting offset credits.

Quantification Protocol – The quantification protocol will provide detailed information on the baseline, boundary, leakage, monitoring, reporting and quantification of emission reductions/removals for a specific project/project type.

- Project-Specific Protocol: Developed for a new project/project –type.

- Standard Protocol: The protocol for a registered project will be used as a precedent for other projects of the same type. If adjustments are required to the standard protocol to meet the circumstances of the project, these adjustments must be justified.

Reforestation – The direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989.

Removal Units (RMUs) – The credits issued for net sink enhancements by eligible activities under Articles 3.3 and 3.4 of the Kyoto Protocol by an Annex I Party. RMUs can be used by an Annex I Party to help meet its commitment under the Kyoto Protocol. Each RMU allows emissions of 1 metric tonne of CO_2 equivalent. See Kyoto Compliance Units.

Revegetation – Under the Kyoto Protocol it is a direct human-induced activity to increase carbon stocks on sites through the establishment of vegetation that covers a minimum area of 0.05 hectares and does not meet the definitions of afforestation and reforestation. Canada must decide by late 2006 whether it wishes to include this activity in its Kyoto Protocol accounting in the first commitment period. It seems unlikely that Canada would include revegetation in its accounting as most land management activities

could be captured under the definitions of forest, cropland or grazing land management.

Sequestration – The process of increasing the carbon in a carbon pool other than the atmosphere.

Sink – Any process, activity or mechanism which removes a greenhouse gas from the atmosphere.

Source – Any process or activity which releases a greenhouse gas into the atmosphere.

Targeted Measures – Targeted Measures including information, incentives, regulation and tax measures that will achieve the national climate change objectives in specific sectors and program areas.

ANNEX 2

LARGE INDUSTRIAL EMITTERS

Large Industrial Emitters (LIEs) include firms in both upstream and downstream oil and gas sectors, electricity generation, and mining and manufacturing, such as cement plants and iron and steel mills. They are expected to produce about half of Canada's total greenhouse gas emissions by 2010.

The Plan proposes that targets for emissions reductions -- totalling 55 Mt CO_2e -- be established for LIEs through a backstop/covenant system. The covenant would be an agreement regarding emission reductions between the LIE and the federal government. The backstop will provide a "default" target for industry and cover such issues as compliance, reporting and verification. Companies will be given the option of remaining under the provisions of the backstop or entering into a covenant with the Government. A LIE could meet its target under the backstop or a covenant in several ways – reduce its own emissions, purchase the emission reductions of other LIEs in the form of domestic permits, purchase Kyoto compliance units, and/or purchase offset credits.

Emission reduction targets are expected to be negotiated with large firms in the following sectors:

- thermal electricity generation (coal, oil and gas)
- oil and gas (upstream extraction, oil and gas pipelines, gas utilities, petroleum refining)
- mining (both metal and non-metal)
- pulp and paper production
- chemical production (industrial inorganic chemicals, industrial organic chemicals and chemical fertilizers and fertilizer materials
- iron and steel production
- smelting and refining
- cement and lime production
- glass and glass container production.

The total number of firms with emission reduction targets is expected to be between 650 and 700.

ANNEX 3

DISCUSSION QUESTIONS

2C Eligibility Criteria

What should be the start date for eligible offset projects? Should the same date be used for all project types? How should the start date of a project be defined?

How should the projects that were reviewed in the PERT, GERT and PERRL pilots be treated?

What is the preferred approach to ensuring clear ownership of emission reductions/removals?

What project types do you think would be suitable as offset projects? What is the annual emission reduction/removal potential for such projects in Canada? Could other approaches achieve these reductions at lower cost?

3A Offset System Governance

What is the appropriate structure and composition of the Program Authority?

3B Review Process

Should government support be provided for the preparation of a quantification protocol for a new project type? If so, what type and level of support would be appropriate?

Who should be responsible for verification – the Program Authority or accredited verification entities?

Should offset credits be issued early? How should the risk of non-delivery be addressed?

4B Boundaries and Leakage

What is the appropriate definition of a project boundary and what sources of leakage should be identified and monitored?

What is the most efficient and workable method for accounting for leakage in the quantification protocol?

4C Addressing Non-Permanence of Removals Projects

How should reversals prior to an offset credit issuance be addressed?

Who should have liability for carbon sink reversals for which offset credits have been issued?

How long must carbon remain sequestered to be considered equivalent to an emission reduction?

Would a strict requirement for a risk management plan be an appropriate way to address non-permanence?

If a tonne-year equivalence approach is used, how many tonne-years should be considered equivalent to a permanent reduction?

If the insurance approach were to be used, how long should the insurance period be?

What would constitute adequate insurance coverage, and would such coverage be offered commercially at a price that would enable sink projects to be viable?

If temporary credits are used, should the validity period be fixed or variable, how long should it be, and should it be set to coincide with the commitment periods?

Which approach(es) to addressing non-permanence should be accepted by the offsets system? If more than one approach is allowed by the rules, should the choice be left to the project proponents or be specified by the rules based on the project type?

5A Forests

Do avoided emission forest projects raise special or particularly difficult issues, for example with respect to baselines and leakage? Are there reasons to not include these projects in an offset system?

How much potential is there for new forest sinks projects? What considerations in offset system design would help overcome the fact that much of the benefit of some forest projects may not occur for a long time?

Do you agree that Option 1 – "Without Project" Baseline - is the preferred option for forest projects?

What methodologies do you think are most appropriate for forest projects, and would be most used under the "without project" baseline approach? Why?

How should changes in regulations be reflected in project baselines under this option, if at all?

Would you prefer Option 2 - Base Period Baseline? If so, what do you think is an appropriate base period for which carbon stock change data are likely to be available?

5B Agriculture

How should changes in carbon stocks be determined for individual projects? If measurement is required what techniques should be used? What are the conditions (e.g., minimum area) under which statistical estimates are appropriate?

How should the baseline account for the BAU increase in the net carbon stock?

How should boundaries be specified for individual agricultural offset projects?

Under the pooling approach, what form of public or private administration of the pool would work best?

Under the pooling approach, what membership criteria should a pool have?

Which approach for participation in the offset system do you think is preferable, and why? Should both approaches be available?

5C Landfill Gas

What do you think of the concepts of Option 1 and Option 2? What is your preference and why?

Based on your preference, what do you think are the most important factors for implementation?

What contribution - expressed as a percent of eligible reductions at a site - do you think would be reasonable?